

99ier

COVERING THE TEXAS INSTRUMENTS
BRAND of HOME COMPUTERS



HOME COMPUTER

magazine

June, 1983

\$3.50 in U.S.A.

PROGRAMMING IS CHILD'S PLAY

4-H and Home Computers

Speech Recognition

LOGO On Vacation

Build A Low-Cost Printer Port

Tracking Your Data On Disk

Games From Aardvark to Zapper



46856B18PPO BO JAMES H11128549
46856B18PPO BISHOP
PO BOX 11212
FT WAYNE IN 46856
47749

46856B18PPO BO JAMES H11128549
46856B18PPO BISHOP
PO BOX 11212
FT WAYNE IN 46856
47749

BUY A BANANA.
SAVE A BUNCH.
MORE TO COME.



Leading Edge Products, Inc., 225 Turnpike Street, Canton, Massachusetts 02021.
Call toll-free 1-800-343-6833; or in Massachusetts call collect (617) 828-8150. Telex 951-694.

Moonbeam Software: Superior Software for the TI-99/4(A)* Home Computer

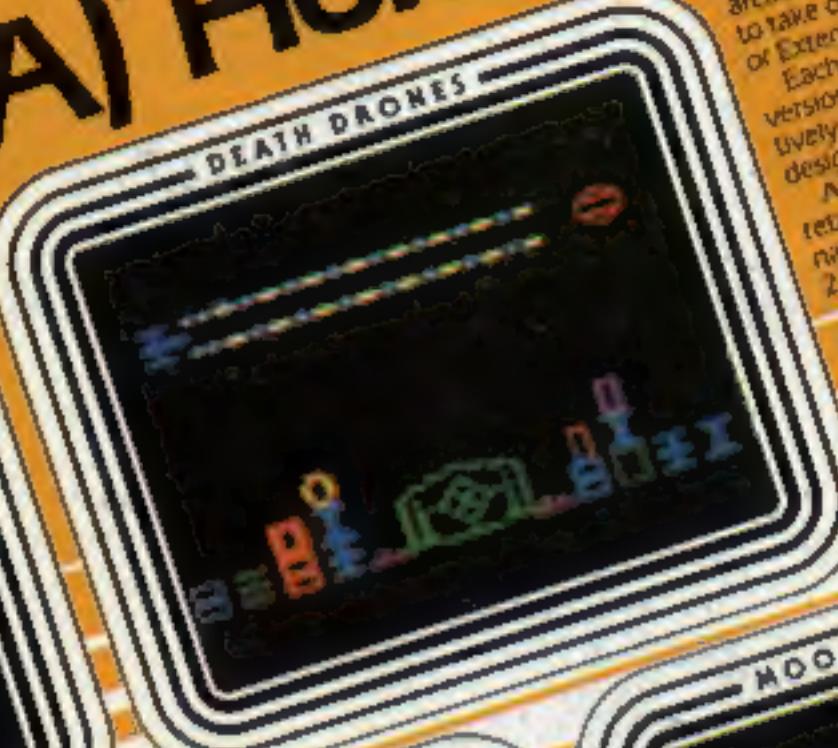
Moonbeam Software will turn your computer into an arcade machine. Super-fast action games now ready to take over your controls! Available in TI-BASIC and Extended BASIC for the 16k console.

Each game includes both keyboard and joystick versions (available on cassette or diskette). Attractively packaged in sturdy, full-color boxes.

Ask for Moonbeam Software at your local retailer, or for a free color brochure send name and address to Moonbeam Software, 2 Bridge St., Northampton, MA 01060.

Dealer inquiries invited. Call Mr. Moon, 413-586-6290.

© 1983 Moonbeam Software, Inc.
Manufactured by International Computer Systems, Inc.



Order any 2 games now —
get one game FREE!

Offer Expires August 31, 1983
Mail to: Moonbeam Software
2 Bridge St., Northampton MA 01060

- DEATH DROPS \$14.95
- MOONVASION \$14.95
- GARBAGE BELLY \$14.95
- STRIKE FORCE 99 \$14.95
- ASTRONAUTIA \$14.95
- CAVERN QUEST \$14.95

Name _____
Street _____

City/State/Zip _____
Signature/Date _____

Enclosed Check/MO

Card No. _____ Exp. Date _____

MAIL: Reg. Add 5% GAMES \$ _____
Shipping & Handling \$ _____

TOTAL \$ _____

ON SCREEN

By Gary M. Kaplan
Publisher & Editor-in-Chief



“In North America, 99'er Home Computer Magazine has been a catalyst for market acceptance of the TI machine and has spawned a rapidly expanding third-party product industry. For TI's world markets, we are going to do the same thing.”

Recently, I had an opportunity to visit some of our fellow 99'ers in Europe. The occasion for my trans-polar trip was the Hanover Trade Fair in Germany—a mammoth, annual exhibition of the industrial world's machinery and electrical goods that draws over 600,000 attendees from around the globe.

My reasons for attending the Fair were two-fold: First, I wanted to see all the progress in computers and peripherals from America and Europe. Of this, there was not much new of significance to the world of home computing—only some new display and printing technologies. With a little help from price reductions, which usually accompany the mass-production environment of consumer electronics, they should find ready applications in low-cost home computer systems. I'll be going into this in more detail in forthcoming issues.

Nevertheless, home computing was represented. The “Big Four” manufacturers of home computers in the U.S. were out there pitching their wares to the world's buyers and the consumer electronics press. The Texas Instruments exhibit did not have the grandeur of its typical CES production. (See the February, 1983 issue.) What it lacked in size, however, it made up for in sheer numbers of visitors. The only new product shown that has yet to be introduced in the U.S. was in the calculator field—the low-cost (about \$70 in the U.S.) TI-66, a programmable calculator for the advanced engineering student or professional who needs sophisticated keystroke programming capabilities. It's designed to be used with the companion PC-200 battery-operated thermal printer (\$70 in the U.S.). It's really quite an impressive little package and should give Hewlett-Packard a run for its money.

My second reason for making the trip was to observe first-hand the European micro-computer situation in preparation for launching international editions of this magazine. North American readers might well ask, “What's in it [foreign language editions] for us?” A fair question. Let me answer by describing two inevitable results of this expansion:

First is the strengthening of TI's market position against its tough European competition. In North America, 99'er Home Computer Magazine has been a catalyst for market acceptance of the TI machine and has spawned a rapidly expanding third-party product industry. For TI's *world* markets, we are going to do the same thing. American manufacturers of home computers are realizing now that they must design and market for *world* consumption. Why? If they are to stay ahead of competition, manufacturers *must* sell huge quantities of machines fast enough to drive costs down. This economy of scale will provide you with better products at significantly lower prices. And we shouldn't forget third-party products either. Our marketing plans call for assisting our advertisers with the necessary conversions, translations, and distribution of their materials for *world* consumption. This too, means that TI users back home will benefit from better, more varied and value-packed products. Our loyal advertisers have supported us; now it's our turn to help them multiply their sales. We all benefit.

The second situation arising from our international expansion (first to Europe, then to other principal TI *world* markets) is the “cross-pollination” of ideas. Think how many more valuable ideas and programs we'll have because vast numbers of the world's talented people can speak to our international Home Computer community. As 99'er HCM translates and disseminates its own brand of compu-prestidigitation among the different language editions, once again, everyone will benefit. Incidentally, if any of our international friends would like to help, we welcome articles, news, and programs. Also, suitably skilled individuals interested in employment with us in our foreign offices are invited to contact me.

Since returning home to Eugene, Oregon, I have been asked many times to describe the European home computer market. Quite truthfully, it's not an easy task because I didn't find a “European market,” but rather a *German* market, *French* market, *British* market, etc. Even within one country, the “market” is often fragmented. This makes it difficult for American firms to sell products over there; it takes quite a bit of local expertise.

I can relate one finding that appeared to transcend geographic boundaries. Expensive ROM-based cartridges don't sell very well in Europe. The much lower-priced cassette medium has taken a stronger toe-hold among software producers for the dozens of home computers. And floppy disk systems are still very expensive all over Europe, so disk-based software doesn't fare very well either. The “lowly” cassette seems to be the universal medium. In North America, a sub-\$100 entry fee into home computing is creating a new consumer base. Whether the expansion of the cartridge market will suffer remains to be seen.

In our next issue, we'll report to you on the Summer Consumer Electronics Show in Chicago—where TI unveils its new offerings. For a preview of what's coming, my editors suggest that you check out our 99'er Digest in this issue.

99'er HOME COMPUTER magazine



CONTENTS

June, 1983 Vol. 2, No. 3

9. The 99/4H Connection

By Cathy Dorr

Children apply computers to "real life" in a 4-H club setting.



13

TI Tuning Fork

By James Noel

A BASIC program to tune your guitar.

16. Voice Technology

Watch what you say to your computer—Voice Recognition is here!

Computer Gaming



21

Chip Shot!

A review of Mini-Golf

By Sharyn Lyon

Out of the sandpit, into the console—a golf game for all seasons.

23. The Straight Flush of Victory

A Review of Challenge Poker

By Judy Sanolian

A Poker-Bingo-Tic-Tac-Toe combo to delight any card-playing ace.

24. Gameware Buffet

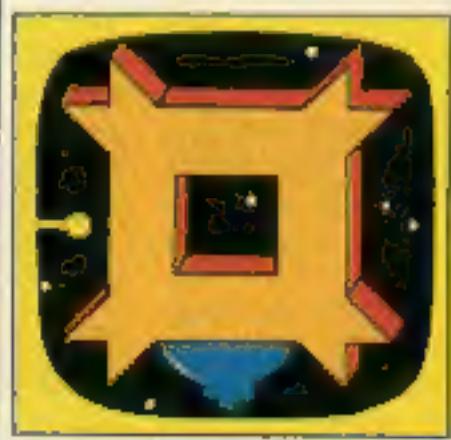


24

Aardvark

By Patrick Pelletier

A colony of ants tries to eat before being eaten.



25

Space Zapper

By Sam Scott

Zap unpredictable aliens before your station loses shield power.

37. Natural Language Technology

The human-computer communications gap narrows—a natural language interface for TI.

38. Multiplan Medium

By Patricia Swift

Communicating with Multiplan using worksheets, templates, and models.



43

Drive for Diskettes—Part 2

By Samuel Pincus

Understanding the inputs and outputs of your disk operating system.

Portable Computing



53

Touring

Compact Computer

Country—Part 3

By David C. Brader

The CC-40, our program and you calculate loan schedules.

LOGO Times



57

Our Pal, LOGO Turtle

By Reva Hunter

Elementary students take us on a LOGO vacation.

59. Letters on LOGO



60

Eight Easy Pieces

By Judy Sanolian

A review of a software package for special learners.

62. Super Language—JoyTalk is Cheap—Part 1

By Paul Urbanus

Construct an RS232/Joystick Interface.

64. On Screen

65. Inside 99'er

66. Letters to the Editor

67. Group Grapevine

68. 99'er Digest

69. 99'er Hall of Fame

70. Debugs on Display

71. 99'er Shopping Bus

72. Index to Advertisers

99'er Home Computer Magazine (ISSN 0279-1927) is published monthly by Emerald Valley Publishing Co., P.O. Box 5537, Eugene, OR 97405. The editorial office is located at 1500 Valley River Drive, Suite 250, Eugene, OR 97401. (Tel. 503-485-8796). Subscription rates in U.S. and its possessions are \$25 for one year, \$45 for two years, and \$63 for three years. In Canada and Mexico add \$7 per year. Other foreign countries \$43 for one year surface mail. Inquire for air delivery. Single copy price in U.S. and its possessions is \$3.50, and \$4.00 in Canada and Mexico. Foreign subscription payment should be in United States funds drawn on a U.S. bank. Second-class postage paid at Eugene, OR 97401. **POSTMASTER:** Send address changes to **99'er Home Computer Magazine**, P.O. Box 5537, Eugene, OR 97405. Subscribers should send all correspondence about subscriptions to above address.

Address all editorial correspondence to the Editor at **99'er Home Computer Magazine**, 1500 Valley River Drive, Suite 250, Eugene, OR 97401. Unacceptable manuscripts will be returned if accompanied by sufficient first class postage and self-addressed envelope. Not responsible for lost manuscripts, photos, or program media. Opinions expressed by the authors are not necessarily those of **99'er Home Computer Magazine**. All mail directed to the "Letters to the Editor" column will be treated as unconditionally assigned for publication, copyright purposes, and use in any other publication or brochure, and are subject to **99'er Home Computer Magazine's** unrestricted right to edit and comment. **99'er Home Computer Magazine** assumes no liability for errors in articles or advertisements. Mention of products by trade name in editorial material or advertisements contained herein in no way constitutes endorsement of the product or products by **99'er Home Computer Magazine** or the publisher unless explicitly stated.

Each separate contribution to this issue and the issue as a collective work. Copyright © 1983 by Emerald Valley Publishing Co. All rights reserved. Copying done for other than personal or internal reference use without the permission of Emerald Valley Publishing Co. is prohibited. Requests for special permission or bulk orders should be addressed to the publisher.

99'er Home Computer Magazine, **99'er Magazine**, **Home Computer Magazine**, and **HCM** are all trademarks of Emerald Valley Publishing Co.

Texas Instruments, TI, Constant Memory, Solid State Software, Hex-bus and Command Cartridge are all trademarks of Texas Instruments, Inc.

Publisher/Editor-in-Chief

Gary M. Kaplan

Managing Editor

David G. Brader

Assistant Editors

Greg Roberts

Judy Sanian

Technical Editors

Robert Ackerman

William K. Balthrop

Sharyn Lyon

G.R. Michaels

Patricia Swift

Copy Editor

Erin O'Connor

Contributing Editors

Henry Gorman, Jr.

Walter Hego

S. T. Holt

Roger Kirchner

Samuel Pincus

Steve Schwartz

Art Director

Hayder Amir

Production Manager

Norman Winney, Jr.

Production & Design

Kathy Garcia

Laredo

Barbara Mickelson

Typesetting

June Gaber

Julienne Laabs

Office Manager

Pat Kaplan

Administration

Debbie Amity

Charisse Loritz

Customer Service

Nita Agol

Irene Alderman

Renee Manning

Circulation & Fulfillment

Janie Cantu

Tom Ecker

Jonnie Hernandez

Benjamin Kaplan

Carol O'Brien

Lyndia Tennant

Bulk Distribution

Ann Crenshaw

Coleen Nelson

Financial Manager

Bob Karau

Accounting

Tasanee Fry

Patana Ratanapreux

Advertising

Linda Brundige

Kathy Kelly

Tel. 503-485-8796

INSIDE

99'er

School's out! And for many of our young people, June is Freedom Month! This issue of **99'er Home Computer Magazine** is fondly dedicated to our children, who will finally have time to do exactly what they want! How will all these creative young minds spend their three-month hiatus from school? Many will play in the sun by day and sequester themselves in front of their computers by night, seeking the solutions to more and more difficult programming problems. Judging by the many imaginative ideas we receive daily, a growing number of children are already expending lots of creative energy at their computer consoles. The samples we publish this month tell us that programming isn't just for grownups anymore. So maybe you should look in the "computer room" the next time you're trying to track down the kids.

Keeping track of our children and their computers may not be so easy this summer—they are meeting in the strangest places these days! In *The 99/4H Connection*, we find them among the horses, cows and pigs learning to program. And that's not all—they are also helping prepare manuals for computer training programs for future generations.

Take a peek with us into the not-so-distant future in two compelling reprints from TI Data System News. The exciting news, according to *Voice Technology*, is that TI has turned a mild-mannered computer into a superphone that dials, talks, and even takes messages for you! The second reprint, *Natural Language Technology Advances*, unveils the use of one of the computer industry's first natural language interfaces. Now TI Professional Computer users can select English words to ask questions of a database or give commands for a specific task. These advances paint a bright picture of the applications in store for Home Computer users!

Our portrait of *Multiplan* is sketched out in greater detail for this month's *Multiplan Medium*. Our mystic mentor divulges her secrets for using worksheets as communication links with *Multiplan*. After reading this article, nothing will prevent you from diving right into the powerful calculating capabilities of this software. Then take a deep dive into your disk drive and its filing capabilities in *Drive for Diskettes—Part 2*. By the end of this article, concepts like internal and display storage, sequential and relative files, tracks and sectors will seem like old friends.

Summertime may be a do-nothing time for some, but it offers hours of uninterrupted time for many young child programmers. We are eagerly awaiting the submissions that are bound to come in between now and the time school starts again. The articles, programs and even the *99'er Hall of Fame* in this issue illustrate the imaginative energy that young people bring to home computing. The future of computers is in good hands—small ones for now—but good hands nevertheless.

Until next month, have fun reading, learning and RUNing

LETTERS TO THE EDITOR

Dear Sir:

In a recent article [May, 1983] in your magazine, you discussed word processors. Some of your readers may hesitate to invest in disk drives and other equipment over and above the costs of the printer itself, upon the suspicion that a word processor might be very handy to have. Some might be deterred by the multitude of special keys and functions (pagination, transliteration, etc.) that they find included in full feature word processors. An intermediate step might be a good way for them to evaluate their needs and gain some working knowledge.

We have been producing a simple (12 special functions), straight-forward word processor for quite some time now. It is called **TYPWRITER**. The responses we receive from users bring a considerable amount of satisfaction that it is a wholly worthwhile and desirable program. We guarantee satisfaction or a full refund (and we have **VERY** few returned).

TYPWRITER has been periodically revised and updated to include as many features and conveniences as allowed by Extended BASIC. It can be modified by a user (with some programming knowledge) if that is desirable. In fact, we provide information to users as new equipment becomes available (such as the new 128K memory expansion card). And we have an up-date service in the case of major revisions.

TYPWRITER comes on cassette or disk and can be used with the free-standing parallel and serial peripherals currently being advertised in your magazine, as well as the expansion box and related cards. It is easily modified to make use of the various memory expansion units. A copy is provided with this letter so you will be able to see that it has these and many other features.

Jim Schwaller
Extended Software Company
Cincinnati, OH 45240

Thanks, Jim, for the opportunity to review your word processing software. (For those readers not familiar with **TYPWRITER** from Extended Software, it originally appeared on the market as **TI-PWRITER** and was one of the very first offered for the Home Computer.) Now that we have your program and user booklet in hand, readers can expect a review of **TYPWRITER** in an upcoming issue.

Our readers have come up with solutions to a question by Charles C. Foster posed in this column (Nov., '82). He wanted to know "how to get sprites to leave a trail." Herewith two solutions in Extended BASIC. Charles:

Dear Sir:

I am what one might call a cautious buyer. After comparing the TI-99 4A with other personal computers on the market, I was convinced that it offered the best programming features and versatility. Now, after four months of BASIC and Extended BASIC programming, I am still convinced.

What impressed me most was the graceful motion achieved by the use of sprites. I soon realized that if this motion could be mapped on the screen, intricate patterns could be drawn. However, I was limited by the low resolution of the 24 x 32 spacing of characters. This results in only 768 positions and choppy, discontinuous lines. In order to use the possible 49,408 pixels on the screen, I thought I would need Assembly Language to "poke" these positions.

However, I worked around this problem in the following way. First, I divided the character space into a 64-pixel grid and assigned a character to each pixel. This was done by assigning each position an array coordinate and a corresponding ASCII number. Once this is done, the position of a sprite can be taken. The row and column of the point can be found from the integer value of the sprite coordinates divided by 8. The remainder decides where on that 64-pixel space the point should be placed.

The result is high resolution line drawing with minimal expenditure of memory and no need for Assembly Language.

The example given in the following program maps the trajectory of a bouncing ball. One recommended set of inputs is 28, 2 and .8 for the vertical velocity, horizontal velocity and damping factor, respectively. Other graphic applications are numerous. For instance, detailed sine curves can be drawn even from console BASIC.

Mark Hom
Bethesda, MD 20814

```
100 CALL CLEAR :: CALL CHAR(97, "3C  
7EFFFFFF7E3C")  
110 DISPLAY AT(3,10) :=""":BOUNCE!"""  
120 DISPLAY AT(19,3) :="VERTICAL VE  
LOCITY:"  
130 DISPLAY AT(12,3) :="HORIZONTAL S  
PEED:"
```

```
140 DISPLAY AT(14,3) :="DAMPING FACT  
OR:"  
150 ACCEPT AT(10,22)BEEP:P :: ACCE  
PT AT(12,21)BEEP:SP :: ACCEPT  
AT(14,19)BEEP:DAMP  
160 RANDOMIZE :: FOR T=1 TO 12 ::  
CALL COLOR(T, INT(RND*13)+3, 1):  
NEXT T :: CALL SPRITE(#1, 97,  
16, 158, 16, 0, 0)  
170 CALL CLEAR :: DIM D(8,8):: A=3  
2 :: B,F=0  
180 FOR Y=0 TO 7 :: FOR X=0 TO 7 ::  
A=A+1 :: D(Y,X)=A :: NEXT X  
:: NEXT Y :: A=32  
190 FOR W=3 TO 0 STEP -1 :: A=A+1  
:: CALL CHAR(A,RPT$("0",B)&STR  
$(2^W)) :: NEXT W :: B=B+1 :: I  
F B<16 THEN 190  
200 FOR U=30 TO 0 STEP 2 :: CALL S  
OUND(-200,220+7*U,U):: NEXT U  
210 P=P*DAMP :: IF P<2 THEN 290  
220 FOR Z=-P TO P :: CALL MOTION(#  
1,Z,SP)  
230 CALL POSITION(#1,R,C):: R1=INT  
(R/8):: C1=INT(C/8)  
240 Y=8*(R/B-R1):: X=8*(C/B-C1)  
250 IF C1>31 THEN CALL LOCATE(#1,R  
,C):: GOTO 230  
260 CALL HCHAR(R1+1,C1+1,0(Y,X))  
270 NEXT Z :: F=F+2 :: IF F>28 THE  
N F=28  
280 CALL SOUND(2,220,F):: GOTO 210  
290 CALL MOTION(#1,0,SP)  
300 FOR A1=1 TO 9 :: CALL COLOR(A1  
,INT(RND*13)+3,1):: CALL KEY(0  
,K,ST):: IF ST THEN CALL CLEAR  
:: CALL CHARSET :: GOTO 100  
310 NEXT A1 :: GOTO 300  
320 END
```

An interesting program, Mark.

The heart of the program—statements 180 and 190—defines the characters left behind as the sprite moves across the screen. The **CALL CHAR** statement in line 190 recognizes that the values 8, 4, 2, and 1 define one-dot blocks in the **CHAR** subprogram, and takes advantage of the ability of the **CHAR** subprogram to fill in character definitions with zeros automatically. (See **TI Extended BASIC**, p. 57.) Line 240 then determines exactly which of the newly-defined, one-dot characters has its dot closest to the last location of the sprite.

Continued

Entering 99'er Programs

New readers should be aware that within the magazine's pages are found actual computer programs that you can put into your Home Computer and enjoy.

Make sure you have any special system components required by the program (i.e., the Speech Synthesizer, Extended BASIC cartridge, etc.). Then, using the console keyboard, you can type the printed

magazine listing (character for character, and line by line) into the computer's memory.

Before entering the program, connect a cassette recorder to the computer. Make sure you have two blank cassette tapes. For each 10-20 lines you type in, use **SAVE CS1** to save that program segment onto one of the tapes. Alternate between the two tapes each time you save the program. Be sure to rewind to the beginning of each

tape before saving, so that you always record over and replace the shorter segment of program lines with the longer segment. By following this procedure, you'll always retain most of your work even if the lights go out or someone turns off the computer.

Double check your typing against the program listing for errors, and then have someone else check it. The most common errors are typing the letter "O" instead of the number "0" (zero)—they are not interchangeable to the computer. This is also true for the letters "I" and "L" and number "1" (one). See "Key-In Reference."

Every time you make a correction to your program, **SAVE CS1** and switch the tapes. Once all the errors are corrected, you will have a good copy of the program on the last tape. Before turning off the computer, put the other cassette tape in your recorder and once again **SAVE CS1**. Now, if one tape gets damaged, you won't have to enter the program listing via the keyboard all over again. Have fun and happy computing.

99'er

Programming Conventions

KEY-IN REFERENCE

99'er =End of Program or Article
compu-prestidigitation
(kōm-pū-prēs-tēdī-jā-tā-shūn) —n. 1. The magical quality of unexpected comprehension that results from presenting technical information about computers in a lively, entertaining, visually attractive and easy-to-understand format. 2. The magical tricks that make a computer sing, dance, and do all sorts of wonderfully useful things.

99'ER VERSION

2.8.1. XB AL MM EM

volume no.	1	2	3	4	5	6	7	8	9	
issue no.	1		2		3		4		5	
version	1 = original program		2		3		4		5	
	2 = no. of update		3		4		5		6	
	3		4		5		6		7	
	4		5		6		7		8	
	5		6		7		8		9	
	6		7		8		9		10	
	7		8		9		10		11	
	8		9		10		11		12	
	9		10		11		12		13	
	10		11		12		13		14	
	11		12		13		14		15	
	12		13		14		15		16	
	13		14		15		16		17	
	14		15		16		17		18	
	15		16		17		18		19	
	16		17		18		19		20	
	17		18		19		20		21	
	18		19		20		21		22	
	19		20		21		22		23	
	20		21		22		23		24	
	21		22		23		24		25	
	22		23		24		25		26	
	23		24		25		26		27	
	24		25		26		27		28	
	25		26		27		28		29	
	26		27		28		29		30	
	27		28		29		30		31	
	28		29		30		31		32	
	29		30		31		32		33	
	30		31		32		33		34	
	31		32		33		34		35	
	32		33		34		35		36	
	33		34		35		36		37	
	34		35		36		37		38	
	35		36		37		38		39	
	36		37		38		39		40	
	37		38		39		40		41	
	38		39		40		41		42	
	39		40		41		42		43	
	40		41		42		43		44	
	41		42		43		44		45	
	42		43		44		45		46	
	43		44		45		46		47	
	44		45		46		47		48	
	45		46		47		48		49	
	46		47		48		49		50	
	47		48		49		50		51	
	48		49		50		51		52	
	49		50		51		52		53	
	50		51		52		53		54	
	51		52		53		54		55	
	52		53		54		55		56	
	53		54		55		56		57	
	54		55		56		57		58	
	55		56		57		58		59	
	56		57		58		59		60	
	57		58		59		60		61	
	58		59		60		61		62	
	59		60		61		62		63	
	60		61		62		63		64	
	61		62		63		64		65	
	62		63		64		65		66	
	63		64		65		66		67	
	64		65		66		67		68	
	65		66		67		68		69	
	66		67		68		69		70	
	67		68		69		70		71	
	68		69		70		71		72	
	69		70		71		72		73	
	70		71		72		73		74	
	71		72		73		74			



Group Grapevine: News of TI Users Groups From Around the World.

It's June and users groups are busting out all over! Two new groups have recently joined the ranks of organized TI users. From Alabama, the **Wiregrass 99/4 Home Computer Users Group** sends us their first newsletter. It sounds like this group has big plans. Interested TI-users in southeast Alabama can contact Dr. Roger Crampton, 106 Harwood Place, Enterprise, AL 36330. From the West Coast, Don Veith of **TEX-BUG** (the Bakersfield TI Users Group) writes to inform us that their fledgling group is welcoming new members. Contact him at 3535 So. H St. #93, Bakersfield, CA 93304.

We were also happy to hear from the **TI Users Group in Melbourne, Australia**. Those Aussies really know how to crank out the newsletters—this one was a whopping 45 pages of listings, tutorials and reprints. Interested parties can reach the group's coordinator, Doug Thomas, at 59 Landstrom Quadrant, Kilsyth, Victoria 3137, Australia, Tel. 03-725-8187.

Meanwhile, back in the heartland, the **Mid/America 99 Users Group** is serious about increasing their membership. Potential recruits can write to the group at P. O. Box 2505, Shawnee Mission, KS 66201 or telephone Terry Brown at (913) 268-7199. The **Kansas City Area TI-99/4A Computer Users Group** has sent us their newsletter which includes a short piece on using the Home Computer to teach the various hand positions of American Sign Language, as well as program listings for drawing the letter "O" in sign language. For further information, contact Larry S. Jacobson, 4511 N. Troost, Kansas City, MO 64106.

We are proud to acknowledge a newly formed club right in our own back yard. The **TI Users Group of Eugene** elected officers on May 7th of this year and adopted a club constitution. Officers elected at the meeting were: President, Alex Tingley; Vice President, Bill Streeter; Treasurer, Henry Luvert. The club meets the first Saturday of each month, 9AM-1PM at the Eugene Public Library. Contact the group at TI Users Group of Eugene, 3577 Hawthorne, Eugene, OR 97402.

A speeding wheel is the logo of the **Daytona 99'ers**. They have developed a computerized telephone bulletin board system to answer questions and exchange information among members between meetings. The group can be reached at P. O. Box 4594, S. Daytona, FL 32021.

And finally, we have received our first users group newsletter *en français*. The **Fichier-99** from the **Montreal-99** group arrived in the mail recently. There was a short piece on *la formule CALL KEY* and mention of the CC-40 as the first of a *nouvelle famille chez Texas* that will be programmable in Enhanced BASIC. The newsletter ends with a cheery *Bonne Programmation!* The group can be contacted at Fichier-99, Rue Sauve Ouest, Montreal, Que. H3L 1Z7 Canada, Tel. 387-1922.

We wish users groups all over the world *bonne chance* this month as they meet to share ideas, problems and solutions. We look forward to hearing from you in any language; TI users share a common dialect after all. So send your letters and newsletters to the Users Group Editor, 99'er Home Computer Magazine, 1500 Valley River Drive, Suite 250, Eugene, OR 97401.

As it stands now, however, any values of vertical velocity (*P*) and damping factor (*DAMP*) which give a value of 24 or larger when multiplied together (that is, if *P'DAMP* \geq 24) result in a *BAD VALUE* message for line 260. One way to avoid this is to screen the input to the *CALL CHAR* statement in line 260 by inserting line 255, with a value test:

255 IF R1 \geq 24 THEN GOTO 270

Try this line; you may be surprised by the results. Other readers will, of course, find other ways to modify sprite motion or value limits in this program to suit their needs.

Dear Sir:

I would like to propose a solution to a problem described by a reader in your November, 1982, issue. The reader was attempting to write a plotting routine in Extended BASIC. He was able to make a sprite follow the shape of a curve and was asking how to leave a "trail" behind the sprite so a plot of the curve would be left on the screen.

I redefined the problem as "How do you put a dot on the screen at a given dot-row and dot-column position?" The enclosed cassette tape contains a subroutine to do this (lines 310-340). Unfortunately you need Extended BASIC to execute this subroutine because BASIC does not allow you to retrieve the hex description of a character. You need to set up two "look-up tables" (variables *H\$* and *HEX\$*) to make the subroutine 310 execute "quickly." Those "look-up tables" are set up once in the program—see subroutine 210 (lines 210–250). The mainline program (lines 100–180) tests the subroutine by allowing you to draw high-resolution shapes on the screen using a joystick. I have applied the same routine for plotting functions of the form *y* = *F*(*x*).

Richard Gibson
Scarborough, Ontario
Canada, M1W 3C4

```

100 REM ****
110 REM
120 REM mainline
130 REM ****
140 GOSUB 180 ! set up data
   for sub310
150 CALL CLEAR :: CALL CHAR(33,"C0")
   :: CALL SPRITE(#1,33,16,10
   0,100)
160 CALL JOYST(1,XR,YR)
170 CALL MOTION(#1,-YR*2,XR*2):: C
   ALL MOTION(#1,0,0):: CALL POSI
   TION(#1,DOTR,DOTC):: GOSUB 310
   :: GO TO 160
180 REM ****
190 REM data for sub310
200 REM ****
210 OPTION BASE 1 :: RESTORE :: DI
   M H$(16,4)
220 DATA B,4,2,1,9,5,3,1,A,6,2,3,B
   ,7,3,3,C,4,6,5,D,5,7,5
230 DATA E,6,6,7,F,7,7,7,8,C,A,9,9
   ,D,B,9,A,E,A,B,B,F,B,B
240 DATA C,C,E,D,D,D,F,D,E,E,E,F,F
   ,F,F,F
250 FOR I=1 TO 16 :: FOR J=1 TO 4
   :: READ H$(I,J):: NEXT J :: NE
   XT I :: HEX$="0123456789ABCDEF
   " :: NN=33 :: RETURN
260 REM ****
270 REM put a dot on the
280 REM screen at position

```

```

290 REM "dotr","dotc"
300 REM ****
310 IF NN>142 OR DOTR>192 THEN RET
   URN
320 R=INT(DOTR/8)+1+(INT(DOTR/8)=D
   OTR/8):: C=INT(DOTC/8)+1+(INT(
   DOTC/8)=DOTC/8):: Y=DOTR-R*8+8
   :: X=DOTC-C*8+8
330 CALL GCHAR(R,C,M):: CALL CHARP
   AT(M,M$):: L=2*Y+(X<5):: NN=NN
   -(M=32):: N=M+(M=32)*(M>NN)
340 CALL CHAR(N,SEG$(M$,1,L-1)&H$(1
   POS(HEX$),SEG$(M$,L,1),1),X+4*(X>4))&SEG$(M$,L+1,16):: CALL
   HCHAR(R,C,N):: RETURN

```

Also an interesting solution.

In this program, the joysticks define the sprite motion in lines 180 and 190. The second *CALL MOTION* statement in line 180 freezes the sprite after it moves two pixels; changing the multiplication factor in the first *CALL MOTION* statement (now 2) will cause the sprite to move by other increments. Of course, other users could define motion in other ways—for instance, mathematically, as Richard suggests—and insert that definition at this point.

The major difference in the two programs is in their character definition methods. Mark defines all the necessary characters in advance and then *CALLS* the appropriate character when needed; this makes his program run quite fast. Richard creates a look-up table and then defines characters as needed with a subroutine; this makes his program run more slowly. For some applications, one solution might be advantageous; for different applications, the other solution might. We suggest that you try 'em out.

Thanks to Mark and Richard for their effort, and for demonstrating that a programming problem almost never has just one solution.

Dear Sir:

I am writing in regard to your "Tiny Tutorials" column [March, '83, p. 50], which dealt with the AND and OR functions in TI BASIC. Comparing a truth table of a logic OR gate with your OR statement, *IF (KEY<0)+(KEY>1) = -1 THEN 370*, one does not come up with quite the same results.

		(KEY<0)	(KEY>0)
		OR	+
KEY<0	KEY>1	(KEY>1)	(KEY>1)
T	T	T	-2
T	F	T	-1
F	T	T	-1
F	F	F	0

The statement "*IF (KEY<0)+(KEY>1) = -1 THEN ...*" satisfies the second and third conditions but not the first; rather, it displays behavior more characteristic of the Exclusive OR. I believe an OR statement should read "*IF (KEY<0) + (KEY>1)<>0 THEN ...*"

Congratulations on the quality of your magazine—it's just what we TI'ers desire.

Laurie Kozun
Grand Center, Alberta

Very sharp. You got us on a fine point. Our function is an OR, but you're absolutely right: It is an Exclusive OR (XOR), which is true if A is true or if B is true, but false if both or if neither are true. Your OR statement will work just fine. Ready to teach a course in Boolean algebra, Laurie?

99'er

Send in Your Photos and Anecdotes

Do you have a favorite photograph (color or black and white) featuring an unusual application of your Home Computer? Would you like to share your unusual or amusing anecdotes relevant to Home Computing? 99'er Home Computer Magazine will pay \$25 for items it publishes. Material chosen will be subject to the same copyright treatment as "Letters to the Editor" as set forth on the Masthead page. No submissions can be returned. Send anecdotes and copies of photos to: Potpourri Editor, 99'er Home Computer Magazine, 1500 Valley River Drive, Suite 250, Eugene, Oregon 97401.

PLEASE HELP

Detach, fold and mail. See other side for instructions.

THANK YOU

Think of it—

This 4-MINUTE QUESTIONNAIRE CAN ACTUALLY IMPACT THE HOME COMPUTER REVOLUTION!!!

FOR ALL READERS

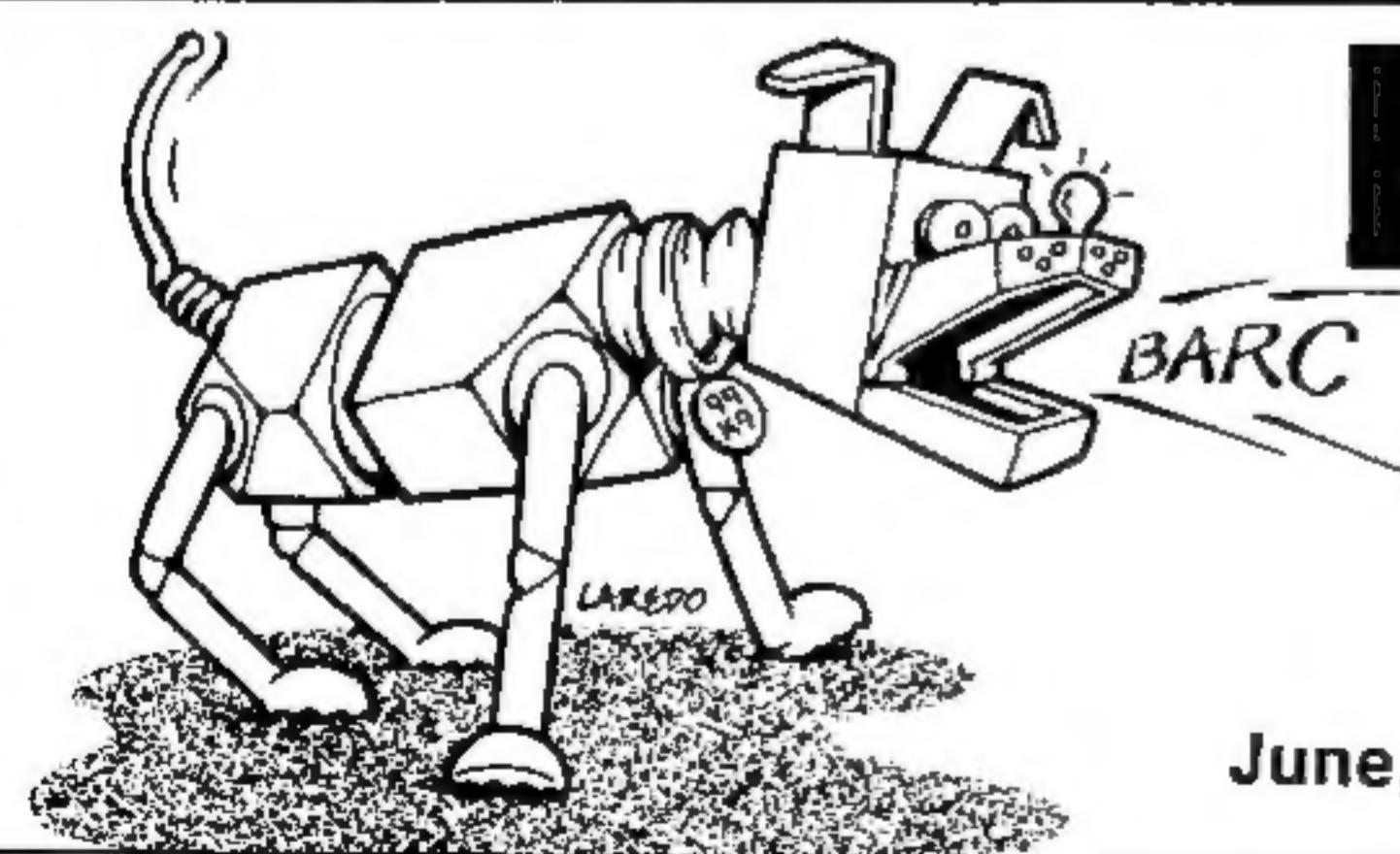
1. Are you presently a subscriber? Yes No
2. If not, do you intend to become one within the next 3 months? Yes No
3. If not a subscriber, where did you get your copy? Newsstand Supermarket Bookstore Airport Users group
 Computer store Chain/department store Borrowed from friend Other place
4. What category of articles do you enjoy the most? BASIC programming tutorials System tutorials Photo features & news items Game programs Education programs Utility programs Product reviews LOGO articles
5. How much total time do you spend with each issue? Less than 2 hours 2-4 hours 5-7 hours 8-10 hours 11-13 hours Over 14 hours
6. How many other computer-related magazines do you currently read? None 1 2-4 5 or more
7. Are you Male Female Under 16 years of age 16-20 21-25 26-30 31-35 36-40 41-50 over 50
8. Are you a student? Yes No
9. What is your annual household income? Under \$5000 \$5000-\$9999 \$10,000-\$14,999 \$15,000-\$19,999
 \$20,000-\$24,999 \$25,000-\$30,000 over \$30,000
10. What is your ZIP code?

FOR READERS WHO DON'T YET HAVE A TI COMPUTER

1. Do you intend to buy a TI computer? No Yes (within 3 months) Yes (within 3-6 months) Yes (within 6-12 months)
2. Which do you think you'll purchase? TI-99/4A Home Computer TI-99/2 Basic Computer Compact Computer 40
3. What do you anticipate your primary use of a TI computer will be? Entertainment Education Computer literacy
 Household management Job-related homework Business Professional use

FOR PRESENT TEXAS INSTRUMENTS COMPUTER USERS

1. Which system(s) do you currently own? 99/4 99/4A 99/2 CC-40
2. What was your primary reason for buying it? Entertainment Education Computer literacy Household management Job-related homework Business Professional use
3. What was your primary reason for buying the Texas Instruments brand?
 Company name/reputation Features for the money 16-bit microprocessor Convinced by friends/relatives Ease of use Prior use in course or "Advantage Club"
4. Which additional TI computer are you likely to purchase within the next 6 months? None 99/4A 99/2 CC-40
5. What peripherals do you currently use? Cassette recorder Disk controller & drive(s) Peripheral Expansion Box RS232 32K Memory Expansion TV 8/W monitor Color Monitor Speech Synthesizer Joysticks Printer Modem p-Code Card Hex-bus Adapter Wafertape Drive
6. Put a CIRCLE around the above peripheral you are most likely to buy within the next 6 months.
7. Mark all TI language software you own or plan to buy within 6 months. Extended BASIC 99/4A Editor/Assembler
 UCSD Pascal LOGO Forth Mini Memory Pilot CC-40 Editor/Assembler
8. How much money do you expect to spend within the next 12 months on your computer system?
Software..... None less than \$30 \$30-50 \$51-100 \$101-250 over \$250
Peripherals..... None less than \$50 \$50-100 \$101-250 \$251-500 over \$500
Books..... None less than \$10 \$10-25 \$26-50 over \$50
Blank tapes & disks..... None less than \$15 \$15-35 \$36-75 over \$75
Furniture, dust covers, & accessories... None less than \$25 \$25-100 over \$100
9. How many software CARTRIDGES do you expect to purchase within the next 12 months?
 None 1-3 4-7 8-12 over 12
10. What % of the above CARTRIDGES will be for entertainment? 0% less than 25% 25-50% 51-75% 76-100%
11. Circle above what % of the CARTRIDGES will be for education.
12. Have you purchased from any of our advertisers in the magazine within the last 6 months?
 No Yes, Software Yes, Peripherals Yes, Books Yes, Blank tapes & disks Yes, Furniture, dust covers & accessories
13. About how much money have you spent on the above purchases?
 less than \$25 \$25-50 \$51-100 \$101-250 \$251-500 \$501-1000 over \$1000
14. On the average, about how many program listings in each issue do you key into your computer and use? None
 1 2 or 3 4 or more



B.A.R.C.* BACK

*(Best Article—Reader's Choice)

Let us know what you like by voting
for your favorite article or program in this issue.

The winning author will receive
a bonus of \$100.00

June, 1983

IF YOU HAVE ALREADY ANSWERED OUR QUESTIONNAIRE . . . Please check here and simply return your B.A.R.C. BACK selection.

Page	Article
9	99/4H Connection
13	TI Tuning Fork
24	Aardvark
25	Space Zapper
38	Multiplan Medium

Author
Gort
Noel
Pelletier
Scott
Swift

Page	Article
43	Drive for Diskettes
53	Touring Compact Computer
57	Our Pal, LOGO Turtle
62	JoyTalk is Cheap

Author
Pincus
Brader
Hunter
Urbanus

THE 99/4H CONNECTION:

99/4H

By Cathy Gort P. O. Box 101 Lake Stevens, WA 98258

What do horses, pigs, and rabbits have in common with a TI-99/4A? Thousands of kids love them and want to learn about them. Now, with the help of dedicated volunteers, kids in 4-H are learning not only about farming and raising animals, but about computers too!

Vince Rice, Co-op Extension Agent in charge of 4-H programs in Snohomish County, Washington, is developing the country's first teaching and learning manuals for 4-H computer projects. When the manuals are completed, they will be available for 4-H leaders and kids all over the country who want to use computers in traditional farm-related projects—or who just want to learn about computers.

The primary goal of the 4-H club is "to provide training in skills that have a basis in agriculture." But according to Rice, 4-H programs often actually prepare kids to "go out into society and compete with any professional in the field."

This is what he and Ron Figg, a 4-H volunteer who is also a systems analyst at the University of Washington, are hoping to achieve with their new computer project series. They've outlined an eleven-part training program that they will eventually develop into eleven separate manuals. These will provide a complete course in BASIC programming, introductions to all of the other major programming languages, and discussion of topics like compilers and sequential access. Figg sees the series as the equivalent of a two-year data processing course. As Rice puts it, "It's a program with no top end. Kids will be able to go as far as they want with it."

For people accustomed to thinking of the 4-H in terms of horses and rabbits, the computer applications may be hard to imagine. But as our economy has shifted from an agricultural base, 4-H has moved along with it. Their project manuals now cover such topics as electricity and electronics, welding, photography, model rockets, motorcycles, and aerodynamics. And now as the country shifts from an industrial to a technical base, it's not too surprising that 4-H is again shifting along with it—this time to include the new information technology.

Computers and 4-H—Why Not?

Computers and 4-H were officially wed when Rice started talking computers with Figg, whose daughters had been active in 4-H for several years. As a parent volunteer, Figg had already helped his daughters learn about raising rabbits. But his real field of expertise was computers. It was inevitable that he would eventually share this knowledge with them too; as Figg says, "If my daughters can benefit from my knowledge in the field, why not all kids?" Rice, who was always on the lookout for 4-H projects that would appeal to kids in cities (as well as on farms), readily agreed.

With all this enthusiasm and kids who were eager to learn, all they needed to get things rolling were the computers themselves. TI was the natural choice. Figg was familiar with TI's quality, technical support, and selection of software. He used a TI terminal at home for his work. One look at TI's educational software was enough to sell Rice on TI too. After a search of local school districts, they located fourteen TI-99/4A's at the nearby Explorer School and worked out an agreement with the school district to use the computers one night a week for 4-H instruction. Last March, with 10 kids, 14 computers, four adults

and two teen-aged, computer-whiz volunteers to serve as tutors, their first computer project (and a long process of documentation) began.

Computers at School

Although students are exposed to computers in the elementary schools from kindergarten on up, very few children are actually learning programming. In many cases, the computers are used only as a teaching aid. This is because schools must utilize their technology to benefit as many students as possible in the time available. This boils down to minimal individual computer time. Elementary schools in Snohomish County, for example, average fewer than six computers per school, to be shared by hundreds of students.

In a classroom day that is already overcrowded with the three R's, fine arts, lunch and recesses, schools lack not only the

Continued on p. 68



You-Ann Figg, whose father is a systems analyst for the University of Washington as well as a 4-H leader, has a bit of an edge on the rest of the group when it comes to computing. In the 4-H group she can share her skills with others like Don and Devina, who haven't had as much exposure to computers.



For everyone who's tried
to top the MX-80, bad news.
We just did.

Epson.

The Epson MX-80 is the best-selling dot matrix impact printer in the world. It has been since its introduction. And despite the host of imitators it spawned, no one has been able to top it. Until now.

FX-80: Son of a legend.

The new Epson FX-80 is far more than just doodads added on to last year's model. It's the most astonishing collection of features ever assembled in a personal printer.

For starters, it's fast: 160 CPS. And clean. All the print quality Epson is famous for in a tack-sharp 9x9 matrix.

But that hardly scratches the surface.

Create your own alphabet.

With the new FX-80, you aren't limited to ASCII characters. You can create your own. Any character or symbol that can be defined in a 9x11 matrix can be added to the FX-80's already impressive library of type styles and stored in its integral 2K RAM.

So you can create "Sally's Gothic" or "Tom's Roman" just by downloading and modifying standard characters. Or you can create a custom set from scratch. Either way, you can store up to 256 new characters. And if you don't need a new alphabet, the RAM functions as a 2K data input buffer.

Who knows graphics better than Epson?

Nobody, that's who. And if you don't believe it, witness the FX-80.

With a 12K ROM capacity, the FX-80 gives you a few things the others don't. For example, not one, not two, but *seven* different dot addressable graphic modes are program

selectable. And can be mixed in the same print line. Everything from 72 DPI (dots-per-inch) Plotter Graphics to the 640 dots per line resolution designed to match the remarkable monitor clarity of the Epson QX-10 personal computer.

And *that* is in addition to an astonishing array of 136 different user-selectable type styles including Proportional, Elite and Italic as well as the more conventional faces you get on other printers.

Hard-to-beat hardware.

The FX-80 has all the hardware features you've come to know and love on the MX Series: logic seeking, bidirectional printing, the by-now-famous disposable printhead, and more.

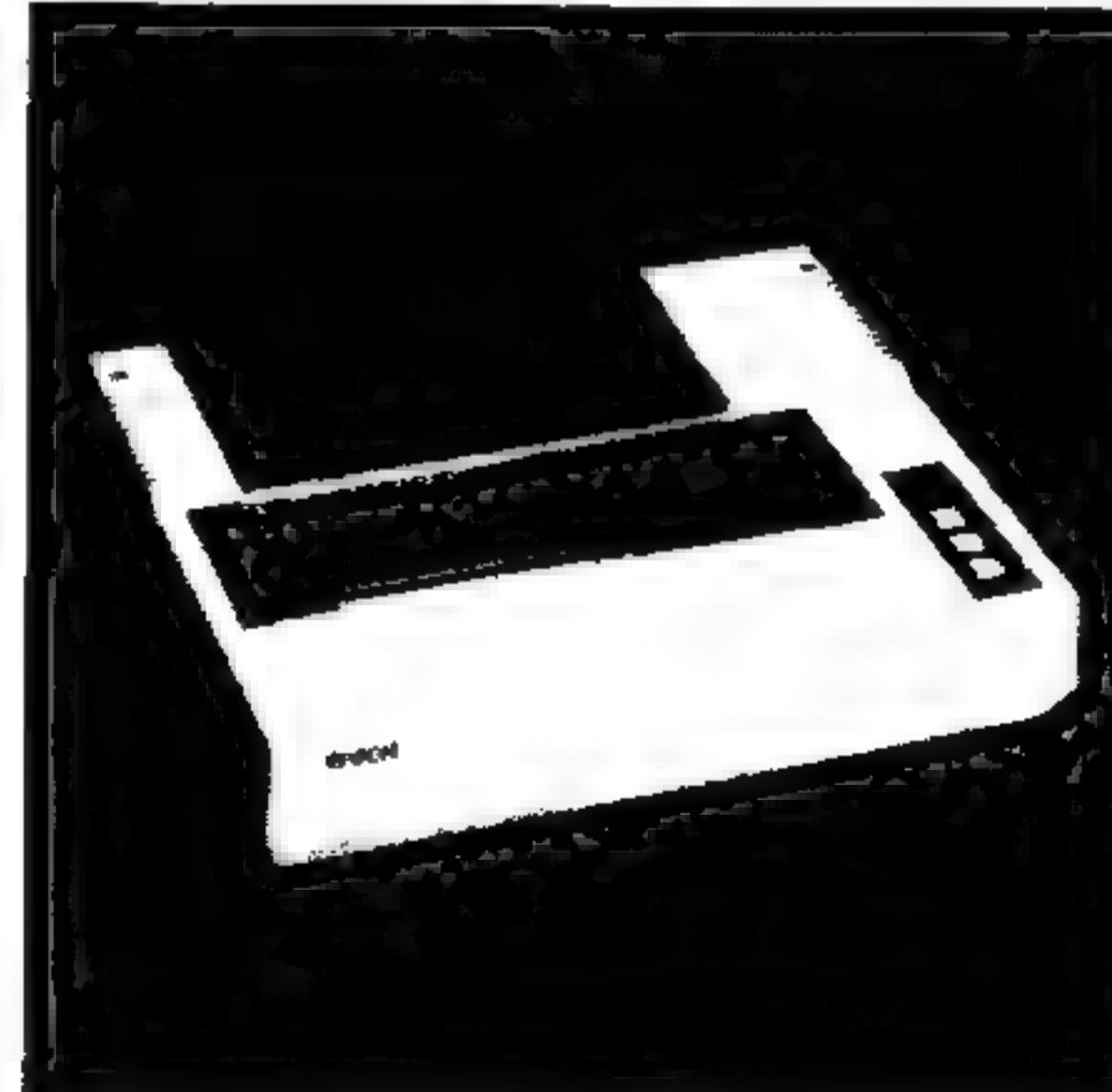
The FX-80 features an adjustable pin platen or optional friction/tractor feed, so you can use fanfold, roll or sheet paper... backwards or forwards. The FX-80 even gives you reverse paper feed.

And if you're printing forms, the FX-80 has a feature you're gonna love: a function that allows you to tear off the paper within one inch of the last print position.

Be the first on your block.

We'd be willing to bet that the FX-80 — like the MX-80 — will have its share of imitators. Don't be fooled. To make sure you get the genuine article, rush down to your local computer store right now and let them show you everything the FX-80 can do.

And while you're there... ask them to show you how it works with our computers.



EPSON
EPSON AMERICA, INC.
COMPUTER PRODUCTS DIVISION

3415 Kashiwa Street
Torrance, California 90505
(213) 539-9140.
Outside California, phone
(800) 421-5426 for the
Epson dealer nearest you.



Norton Software
P.O. Box 575
Picton, Ontario
Canada K0K 2T0

TI99/4(A)

6 Reasons Why We're the "Name of the Game"TM



1. Cross Country Car Rally.

Fast action road race.

(Ext. Basic only) (K) 19.95
Cassette

2. Attack-man. More than just a maze game.

(Ext. Basic only) (K/J) 19.95

Cassette

3. Super Frogger. Cross 5 lanes of traffic, 2 barges, 3 logs, treacherous pirhana infested waters and get eaten by the alligators anyway!

(Ext. Basic only) (K/J) 19.95
Cassette

(K/J) Keyboard and Joystick versions included
(K) - Keyboard only

4. 3-D Startrek. Adds an exciting new dimension to Startrek.

(Specify Ext. or console) (K) 14.95
Cassette

5. Lunar Lander. Crash on your favorite planet; many challenging levels.

(Specify Ext. or console) (K) 14.95
Cassette

6. Tank. Blast the computer or an opponent.

(Specify Ext. or console) (K/J) 14.95
Cassette

Diskette versions are \$4.00 extra and require use of the optional memory expansion unit.

Add \$2.00 shipping and handling charges for less than three games.

Receive a 20% discount if you order 3 or more games.

All programs available in Ext. Basic unless otherwise indicated in the description. Please Specify.

Ont. Res. add 7% sales tax.

Send for a FREE brochure to get a complete description of our Applications, Games and Assembly Language programs.

Dealer Inquiries Welcome.



THE TWINKLING FORK



I was one of those hesitant newcomers to computing, someone who never really liked math and tried his best to stay away from anything involving more than a very few numbers. But about seven months ago my wife and I finally agreed that I should learn something about these machines, and the TI-99/4A moved in with us. My job involved operating a computer monitoring system, and I wanted to know more than just how to press the right button at the right time. So I began pressing buttons and learning TI BASIC.

This program started out as an experiment. I was wondering if my limited programming knowledge was sufficient to let me write a useful program. GOSUB statements baited me, so I tried to incorporate them into the program to see how they work. I thought graphics added a lot of interest to the programs I'd seen, so I figured I'd fit some in. Music has always interested me; I've played the guitar since my teens. So it all added up to a program for tuning the guitar. With a few minor changes, this program can be modified for tuning other string instruments as well. In fact, if you are a more advanced programmer, you can probably adapt these humble beginnings into a program to tune your piano. Once your program is created with the pitches for the notes from middle C to the C above it stored in memory, you can use your own sense of relative pitch to tune the other octaves. Somebody out there could probably even suggest some way to put relative pitch right into the program. For me, however, creating a program to tune my guitar was an accomplishment enough.

I designed the guitar graphics to spruce up the title page. A character definition program from a friend was particularly helpful here. A hint from an earlier issue of 99'er showed me how to combine FOR NEXT and PRINT statements to scroll the title.

The menu is pretty straightforward. It lists the six guitar strings by number and allows you to choose the one you want to hear. After the choice is entered, a

graphic of the guitar neck appears. You then hear the string tone repeated 20 times (the string you are hearing is highlighted to set it off from the remaining strings). This gives you time to adjust the tension of your string to the computer tone. Do this six times and PRESTO! you've tuned your guitar.

Graphic Harmony

I worked up a guitar neck graphic and used a GOSUB statement to provide the graphic each time you enter a new string number. The TI manual listed the string frequencies so that was easy. Another new statement ON X GOTO got me from the menu to the particular string on the guitar neck graphic. Color helped me highlight the desired string. This string appeared white on the portable black and white set that I use for programming. Things moved along well until I hooked it all up to our color set to watch it fly.

It flew like a rock. It seemed that I had defined some guitar string characters with numbers that fell within the sets for the regular letters. This meant that when the program sent you back to the menu, several of the letters were blue while the rest appeared black. Don't get me wrong—I have nothing against blue—but it looks better if all your letters are the same color. Substituting numbers within different sets and adding a FOR-NEXT statement CALL COLOR combination to return all the letters to black solved this problem.

The same problem appeared with the guitar string colors. Each string had to be defined in a different set so that only one would appear highlighted. A color TV made me feel more "color creative" so I changed the screen color to cyan. Finally, two FOR NEXT statements gave me the sound of the string with a delay and 20 repetitions.

This isn't a program with a lot of flash. It doesn't dry the dishes while you wash them. In fact, someone will undoubtedly change a few things here and there to clean it up. But you see, that's all right. I wrote the program to prove to myself that

I could do it. Remember, I'm the guy who hates anything involving numbers. The II-99/4A is a remarkable machine that will provide hours of entertainment to anyone willing to invest the time to get to know it. Now if I can just save enough money, maybe I'll learn to program in Extended BASIC next!

BASIC

Tune Your Guitar *Explanation of the Program*

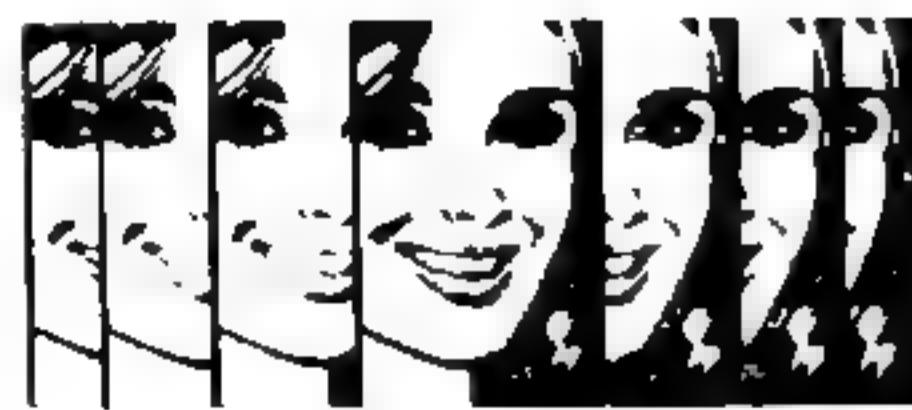
Line Nos

100-170	Program header.
180-370	Define graphics characters.
380-500	Display title screen.
510-750	Display options screen and input option.
760-1410	Control loops for the six different strings.
760-860	First string.
870-970	Second string.
980-1080	Third string.
1090-1190	Fourth string.
1200-1300	Fifth string.
1310-1410	Sixth string.
1420-1660	Display graphics.

```
180 REM 本本本本本本本本本本
190 REM * TUNE YOUR *
200 REM * GUITAR *
210 REM **本本本本本本本本本本
220 REM BY JAMES R. NOEL
230 REM 99'ER VERSION 2.B.1
240 REM
250 REM
260 CALL CLEAR
270 CALL SCREEN(8)
280 REM *STRINGS*
290 CALL CHAR(33, "1010101010101010
  ")
300 CALL CHAR(40, "1010101010101010
  ")
310 CALL CHAR(48, "1010101010101010
  ")
320 CALL CHAR(56, "1010101010101010
  ")
330 CALL CHAR(64, "1010101010101010
  ")
340 CALL CHAR(128, "1010101010101010
  ")
350 CALL CHAR(136, "1010101010101010
  ")
360 REM *NUT*
370 CALL CHAR(91, "FFFFFFFFFFFF")
  ")
```

Continued on p

Personality Analyzer



Analyze yourself, your spouse, your date, relatives, co-workers, and friends.

Find out who you will get along with, who will work well with you, who will be fun to be with.

Measure compatibility, career potential, behavior tendencies, values, etc.

 \$24.95 

Software International

1634 LAVAL DR.
CINCINNATI, OH 45230

Phone: 1-513-474-4536

Send \$2.00 for Catalog of
TI 99/4A SOFTWARE

SHOPPING FOR A PRINTER? CHECK US OUT

PROWRITER 120CPS

8510(Parallel) \$399.00

8510(Serial) \$569.00

GEMINI 100CPS

10*(Parallel) \$339.00

10*(Serial) \$419.00

SEIKOSHA 50CPS

GX-100P(Parallel) 10*
tractor feed \$219.00

CABLES FOR TI

With printer purchase

Parallel \$19.95

Serial \$23.95

MC and VISA add 3%

All prices less shipping

MIDWEST
TECHNICAL
ASSOC, INC
PO BOX 6537
ST LOUIS, MO 63125
314-487-0821

The Softies Presents: **CATERPILLAR®**

A fast-paced NONVIOLENT game suitable for the entire family.

You must skillfully maneuver your growing caterpillar through the increasingly complex series of mazes. Watch out!! You don't want to run into yourself.

Runs in Basic or
Extended Basic
Cassette — \$10.50

**Another Classic Game by
The Softies**

Step-by-step guide to learning assembly language.

**Assembler Tutorial Manual
\$12.50**

Send check or money order to:

The Softies
7300 Gallagher, Suite 229
Edina, Minnesota 55435

MN Residents add 6% sales tax.

The Doryt Connection: Because you shouldn't have to pay for something you don't need.

Paraprint 18A can save TI-99/4A users up to \$300.

Our Paraprint 18A interfaces between the TI-99/4A and any parallel printer, eliminating the need for the TI Peripheral Expansion Box and the RS-232 Interface Card. It plugs directly into the TI-99/4A, is fully compatible and provides daisy chain connection for TI peripherals. And our price is only \$105, so you save up to \$300 in the bargain!

Doryt also provides savings on additional 32K memory. Ours costs only \$175 and you don't have to buy the Peripheral Expansion Box. Plus it plugs directly into the TI-99/4A, is fully compatible with all TI software and provides daisy chain connection for peripheral units.

As a further service, Doryt can provide an economical printer for the system.

Buy the Doryt 18A, 32K memory, printer, and our interconnecting cable before July 4th, and save an additional \$50 on the total package! Call collect (516) 676-7950.

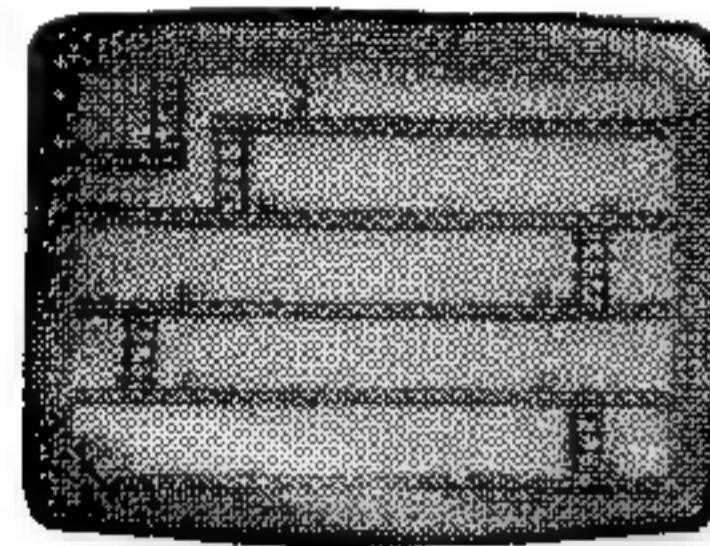
**Doryt
Systems, Inc.**

14 Glen Street
Glen Cove, N.Y. 11542
(516) 676-7950

Dealer inquiries invited.

SOFTWARE FOR THE 99/4(A)

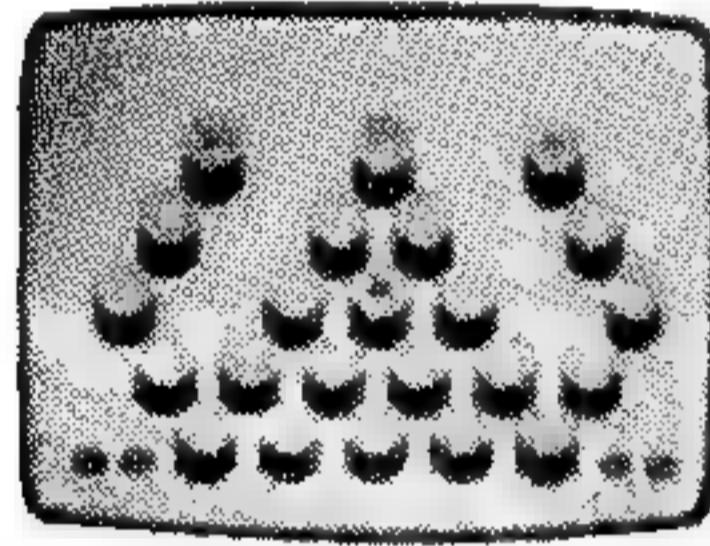
GAMES PAK/III



KONG

Help KONG fight his way to the top of the warehouse, avoiding rolling barrels and trap-doors, to save Roxanne from the bomb set in motion toward her by the villainous Igor. Six different screens. Action from all directions. Joysticks required.

Cassette or Diskette \$15.00



BOUNCER

BOUNCER bounds from one trampoline to another, scoring points for clearing off the squares. He must avoid the arrows which will burst him. Six different screens, each more difficult than the last. Uniquely coordinated sprites, graphics and sounds make BOUNCER so like a real arcade game, you will wonder why we didn't provide a slot for the quarters. Joysticks required.

Cassette or Diskette \$15.00

ROMEO

ROMEO has a goal. But he must traverse the blazing desert dunes, swim a stream infested with alligators and sharks, and bolt through treacherous terrain for his just reward. This is enough action to wear out a good set of joysticks!

Cassette or Diskette \$15.00

GAMES PAK/II

ARTILLERY

The opposing force must be destroyed by determining angle and force of each shot. An ever changing wind complicates matters. Play is between two players or one player against the computer. Simulates actual ballistic trajectories.

Cassette or Diskette \$9.95

IF YOU ARE NOT COMPLETELY SATISFIED, YOU MAY RETURN THE PROGRAMS (and instructions) WITHIN 15 DAYS FOR A FULL REFUND OF YOUR PURCHASE PRICE.

All programs operate on the 99/4 & 99/4A. Specify model for Typewriter

A detailed catalog is available free. Circle "FREE" on the order form or send a letter or postcard

Dealer inquiries welcome

Programmer inquiries invited.

DE-CYPHER

An encrypted message is displayed and guesses change all corresponding letters to the guess. Includes a help feature. Comes with 50 messages which can be changed or more can be added

Cassette or Diskette \$9.95

PUZZLE 15

Move alphabetic squares (A to O) into the single empty slot in an effort to arrange them into order. The computer keeps track of the number of moves taken to solve the puzzle and scores of previous games are displayed for comparison. Multiple squares may be moved when appropriate

Cassette or Diskette \$9.95

FLIP CHECKERS

Outsmart the computer or an opponent by getting all checkers flipped to your color. Computer determines its moves pleasingly fast. A board game with no pieces to lose. Joysticks required

Cassette or Diskette \$9.95

GAMES PAK/I

FROGGY

Jump FROGGY across 10 lanes of traffic then across 6 logs; keyboard or joysticks. Fabulous sprite action!



Works Like A Real Arcade Game

Cassette or Diskette \$9.95

EXTENDED BASEBALL

Joystick control of the pitcher and the batter, and individual batting averages that specifically effect the batting algorithm. Multi-base and multi-runner plays. Joysticks required.

Cassette or Diskette \$9.95

GORFIA PESTULITIS

Joystick control of a laser sight or inertia influenced space mines to shoot down the invading Gorfians. Joysticks required

Cassette or Diskette \$9.95

EXTENDED HANGMAN

Quick graphics, music, color, speech (optional) and sound are added to keep the players entertained. Includes 580 words of 4 to 9 letters in length in easy, medium, and difficult groups.

Cassette or Diskette \$9.95

TIC-TAC-TOE

Quick set-up and quick decision making at four levels of difficulty. The levels avoid the frustration of the novice never having a chance to win, while the most difficult level will challenge the pros.

Cassette or Diskette \$9.95

TYPWRITER*

a complete WORD PROCESSOR
Now With Right Justify

Any Input/Output storage of text - disc, cassette, cassette input/disc output, or vice versa

Complete text *Editing* — by cursor control, including insert & delete lines, partial print, printer halt or abort without text loss, page FWD & BKWD, and more.

Complete *Software Control of Printer* (depending upon its capabilities) — for enhanced print, underlining, formatting, 28 to 256 characters per print line, etc

No Special Equipment — monitor, console Extended Basic module, C or D. printer

Comes with a 20 page instruction booklet
Cassette \$32.00 Diskette \$35.00

NAME-IT*

DATA BASE for: Mail Lists, Labels, Files

Records: 250 records per diskette consisting of up to nine 28-character items per record. Prompts: user designated prompts.

Complete *File Sort*: 250 records in 100 Seconds.

Search; Pre-set; print labels & lists.

Includes a FORM LETTER program that uses NAME-IT data in TYPWRITER generated form letters.

Cassette version differs from disk version.
Cassette \$32.00 Diskette \$35.00

*Should you decide to up-grade to the TI-WRITER module, TYPWRITER and NAME-IT data can be converted for use by that module. NAME-IT alone, will generate 250 TI-WRITER form letter records.

TI-WRITER is copyrighted software of Texas Instr

SCREEN/DUMP

Print the screen on a dot-matrix printer. Does not require extra memory! Disk version is simple to use. Cassette version requires mild programming knowledge.

Cassette or Diskette \$12.00

MASTER CATALOG

A master index of your disks and programs.

Being readied at press time.

Should include: Up to 100 disks can be catalogued with up to 100 programs each — a total of 1000 programs. Look-up time from a cold start: under one minute! Look-up time from a running program: 15 to 25 seconds! Sort time: none.

List on screen or a printer in alphabetical order by program name or disk name.

Diskette (only) \$15.00

ORDER FORM

EXTENDED BASIC MODULE REQUIRED FOR ALL

	\$	FREE
GAMES PAK/I	\$26.95	(C or D)
(Froggy, Extended Baseball, Gorfia Pestulitis, Extended Hangman, Tic-Tac-Toe)		
GAMES PAK/II (Artillery, De-Cypher, Puzzle 15, Flip Checkers)	\$26.95	(C or D)
GAMES PAK/III (Kong, Bouncer, Romeo)	\$26.95	(C or D)
TYPWRITER (word processor)	\$32.00	(C price)
	\$35.00	(D price)
NAME-IT (data base/mail list)	\$32.00	(C price)
	\$35.00	(D price)
SCREEN/DUMP (printer required)	\$12.00	(C or D)
	\$15.00	(D only)
MASTER CATALOG		
INDIVIDUAL GAMES: (C or D)		
<input type="checkbox"/> Froggy	<input type="checkbox"/> Extended Baseball	<input type="checkbox"/> Gorfia Pestulitis
<input type="checkbox"/> Tic-Tac Toe	<input type="checkbox"/> Artillery	<input type="checkbox"/> De-Cypher
		<input type="checkbox"/> Extended Hangman
		<input type="checkbox"/> Puzzle 15
		<input type="checkbox"/> Bouncer
		<input type="checkbox"/> Romeo
		<input type="checkbox"/> Kong
		<input type="checkbox"/> Flip Checkers

Send this form or a substitute with check or money order to:

Extended Software Company
11987 Cedar Creek Drive
Cincinnati, Ohio 45240

Total Individual Games:
Shipping & Handling via First Class Mail (or Air Mail Overseas):

Sales Tax

Add \$2.00 if C.O.D. (U.S. Mail Only):

Check or money order or C.O.D. Total:

\$ _____
Included
Included

\$ _____
Included
Included

\$ _____
Included
Included

Cut Here (may be copied or substituted)

PLATO LIVES. In TI's Home Computer.

If you want to see your kids do better in school, it's time they met PLATO™ from Texas Instruments. PLATO Basic Skills and High School Skills courseware is the most extensive computer teaching system ever developed for kindergarten through 12th grade. Until now, it was only used in schools to give children a special edge—but now they can use it at home—exclusively on the Texas Instruments 99/4A Home Computer.

The PLATO system, developed by Control Data, uses proven methods and techniques that make learning so interesting you may have a hard time getting the kids away from the computer. And they'll be learning at their own pace, from a machine that never criticizes; that builds on their newly acquired knowledge; that rewards them with a real sense of accomplishment.

PLATO Basic Skills and High School Skills courseware offers all the subjects a child needs. It teaches math, reading, social studies, grammar, science—more than 108 essential courses that build the foundation of a solid education.

Take PLATO home. And introduce your kids to the knowledge that lives in the Texas Instruments 99/4A Home Computer.

For more information, please call toll free (800) 858-4565.

Creating useful products
and services for you.



TEXAS INSTRUMENTS

Copyright © 1981 Texas Instruments

PLATO is a trademark of Control Data Corporation, U.S.A. Copyright © 1981 Control Data Corporation. All rights reserved. PLATO software is manufactured under license from Texas Instruments Incorporated.

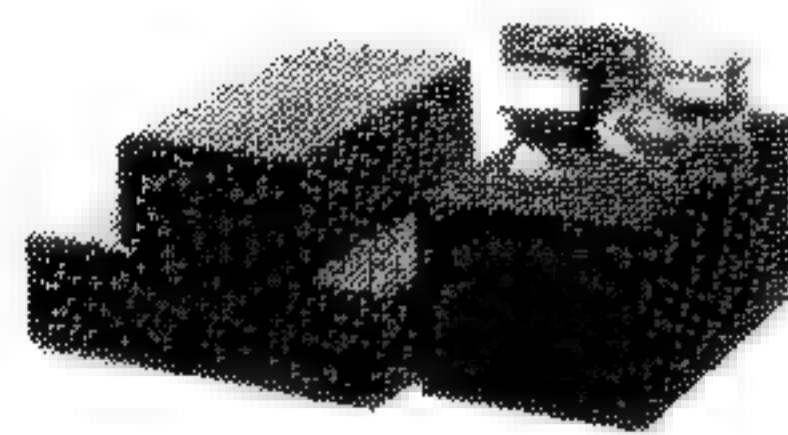




TI-99 DRIVES, BY SHUGART

The Shugart reputation for quality and reliability—now only \$197.50

- internal or external • 270 day warranty)



TI 99 External Drive case/supply

- Accommodates all 5 1/4 drives
- Over current, over voltage protected
- 120 day warranty

Power Supply/Case Assemblies

• Dual Drive horizontal mount.....	74.95
• Dual Drive vertical mount.....	74.95
• Single Drive horizontal mount.....	39.95
• Dual open frame supply.....	54.95
• 2 drive cable.....	21.00
• 4 drive.....	32.00
• Dual case, horiz or vert (w/o PS).....	24.95
• Single case, horiz.....	18.95

Terms: Personal checks allow 14 days, COD, MO., Certified Checks . . . Credit Cards add 3.5% Shipping and Handling: \$3.00 West and \$5.50 East states. All shipping UPS surface, other means extra.

Send to:

Computer Peripheral Resources

P.O. Box 834

or call:

Oak Harbor, WA 98277

(206) 679-4797

ultra - software

Cobra Command

Assembly language! Pilot a super hot Cobra Helicopter over rough terrain where you battle Heavy S. Nemesis and Sorox Fighters. Neutralize the heavily armed Hardon Bunkers and land to rescue your people.

MMM \$19.95

Assembly language! Bounce Egg-Bert around the pyramid of 3-D cubes. Change all the cubes to a new color before the leaping enemies catch Egg-Bert. Fabulous graphics sound and fun.

MMM \$19.95



Command a fleet of Robot Mining Vessels in Megidon Sector where you confront the most hazardous Pulsars in the Galaxy. Mine Teranium Ore and survive the terrors of an alien Pulsar Systems. Speech optional. X-BASIC \$14.95



Pilot your vintage Curtiss JN-4 Biplane cross-country in spectacular aero-graphics. Rescue paratroopers and land at refueling airstrips while avoiding storms and enemy aircraft.

X-BASIC \$14.95



MMM EDIT-ASSMBLR Buy this Editor Assembler combo and say goodbye to the line-by-line Bites. Powerful, easy-to-learn editor allows you to save your source code for easy modification. Enhanced symbolic assembler includes several features not found in the Line-by-Line Assembler. **Features:** • Save/Restore from one or two cassette drives • Allows programming of all 4K of MMM • Over 20 edit commands • Allows merging of separate programs in whole or by parts • 10 assembler directives including DEF & TEXT • Pre-loaded symbol table contains addresses for all MMM ROM routines. **SPECIAL BONUS:** Includes dis-assembler for decoding other programs or ROM routines.

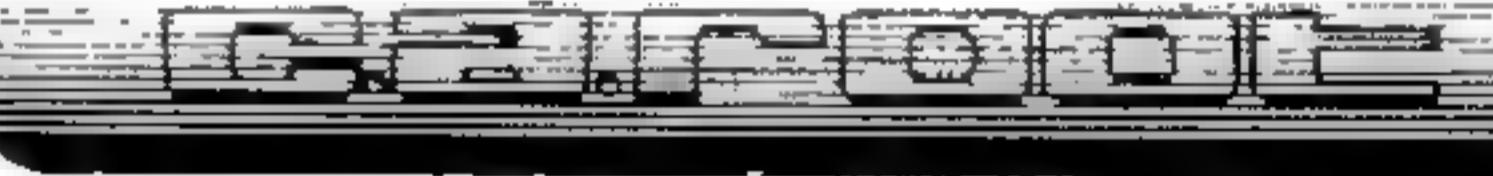
\$24.95

Takes all the guesswork out of game development. Includes a comprehensive manual and a powerful graphics editor. From Algorithms to Sprites. It will reveal the gaming secrets and tricks professionals use.

X-BASIC \$19.95

c a. root associates suite 8109 32700 pacific hwy. so. federal way, wa 98003

- Send us \$2.00 and we'll send you our brochure on the hands-off demo of our software (X-BASIC)
- All prices are for cassettes add \$2.00 for diskette version
- All games and On Gaming require joystick
- Washington State residents add 7.6% sales tax
- Visa and Mastercharge welcome, no surcharge
- DEALER INQUIRIES INVITED



ARCADE STYLE GAMES

PROFESSIONAL UTILITIES

PROFESSIONAL UTILITIES

FREE OFFER! COMPUTER CASSETTES

58¢

FREE TI-Compatible
"Word Challenge Game"
with each order of
20 or more C-10's

- C-10 Length
- 5 Screw Shell
- Lifetime money back guarantee
- Storage Box add 12¢ each
- \$2.00 shipping charge-any quantity
- Send check or money order to

PARALLEL SYSTEMS

Box 772
Blackwood, NJ 08012
609-227-9634

FOX VALLEY SOFTWARE

COMPUTERIZED CRAYOLA—a unique graphics program for young and old, lets your imagination run wild.

MORTGAGE & LOAN AMORTIZATION SCHEDULE—figures monthly payment, interest, principal and balance for each month, for term of loan.

MANY MINI'S—several useful and entertaining programs such as life expectancy, blood alcohol content and more on one cassette tape.

HOME BREWED ANTENNAS—a very useful program for hams—s.w.l.'s-t.v dxer's and c.b.er's. Covers quads, quagis, dipoles and long wires. Also computes how much to prune from first s.w.r. curve.

ALL PROGRAMS ON CASSETTE TAPE AND IN BASIC. TI-99/4A AND CASSETTE PLAYER ARE ALL THAT ARE NEEDED TO RUN PROGRAMS.

ALL PROGRAMS ARE \$14.95 EACH. SHIPPING AND HANDLING ARE INCLUDED IN PRICE.

SEND CHECK OR MONEY ORDER TO:

FOX VALLEY SOFTWARE
4954 LORI LANE
ELGIN, ILLINOIS 60120

ALLOW TEN DAYS FOR DELIVERY.
DEALERS INQUIRIES INVITED.
ILLINOIS RESIDENTS ADD 5% SALES TAX.

COMPUTER GAMING



CHIP SHOT

A Review of Mini-Golf

By Sharyn Lyon

Technical Editor

Name:	Mini-Golf
Author:	James W. Bebien
Program Type:	Simulation game
Language:	Extended BASIC
Distributor:	Berry Funware
P. O. Box:	27644
Denver, CO:	80227
Price:	\$12.95, cassette or diskette

System Requirements:
Extended BASIC Cartridge
Cassette Recorder

Performance	Fast	Slow	Good	Excellent
Graphics	Good	Good	Good	Good
Documentation	Good	Good	Good	Good

Well, didn't you know it? All week you've been looking forward to your golf day, and now it's raining. Don't worry, it looks like you'll have to go to your favorite leisure time activity and clean the garage instead. Well, cheer up, Berry Funware has come to your rescue with their Mini-Golf game. This simulation of the recreational favorite has many of the elements of outdoor golf plus some extra added attractions to keep you saying "hole!" and asking for more.

As you would expect, the screen display looks something like an outdoor golf course. Each well-trimmed green is complete with sand traps and a cloudless blue sky. Built-in outdoor golf the distant cup is marked by a teeny tag that you may or may not be able to see from your tee-off point. This video version lets you see the entire hole from a bird's-eye view. The cup into which you must hit the ball is clearly visible. Your starting place is indicated on the screen by a small round ball to differentiate it from the cup, which is arge-

The graphics are nice, though, and the colors pleasing to the eye. If they were any more complicated, the graphics would distract you from your goal to play the course through and attain the lowest possible score. You may play a one continually trying to lower your score, or compete against one opponent. We found the 2 player version of the game slow moving. The second player also has a distinct advantage since he can learn from Player 1's miscalculations and successes. In the interest of fair play, therefore, we recommend that when you play several games in succession, you alternate the role of

Computer Gaming is a section for all game lovers—players, designers, and programmers of microcomputer games. Regular features include product reviews, letters to the editor, player strategy, a question and answer forum, a Hall of Fame for high scorers, tutorial articles on game design and programming, plus interviews with professionals in the world of computer gaming.

All submissions for Pros on Programming are governed by the same conditions and payment rate as manuscripts sent to other departments of 99'er Home Computer Magazine. Materials submitted for the features shown below are treated the same for Copyright purposes as Letters to the Editor in 99'er Home Computer Magazine (as explained in the Masthead); if chosen for publication, the material (except for 99'er Hall of Fame) will earn for its author a free computer game (either TI or third-party) and/or a one-year subscription to this magazine.

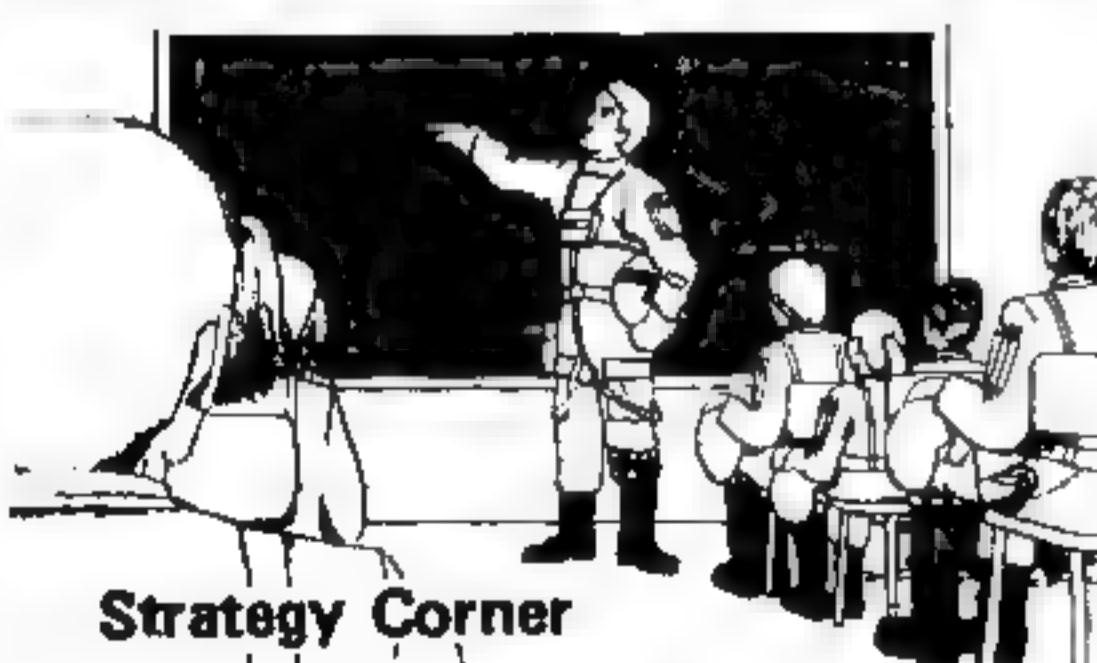
99'er Hall of Fame candidates with high scores in TI, third-party, or Computer Gaming games must completely describe the conditions under which their scores were achieved (i.e., skill level, keyboard or joystick use, screen number, partner participation, appearance of screen, etc.) Candidates may not be directly related to or affiliated with the programmer of the game or the publishing firm. No compensation will be provided to new inductees whose names are chosen to be immortalized—Fame is its own reward...

Game Review Criteria

Game Performance measures how well the game responds to the player's commands, rates the quality and realism of the graphics and animation, and examines how well the sound effects, music or speech are integrated into the game. It also determines whether the game delivers what is promised in its advertisements.

Engrossment focuses on that intangible quality that holds the player on the edge of his seat while the hours tick by unnoticed. The game's staying power is also assessed.

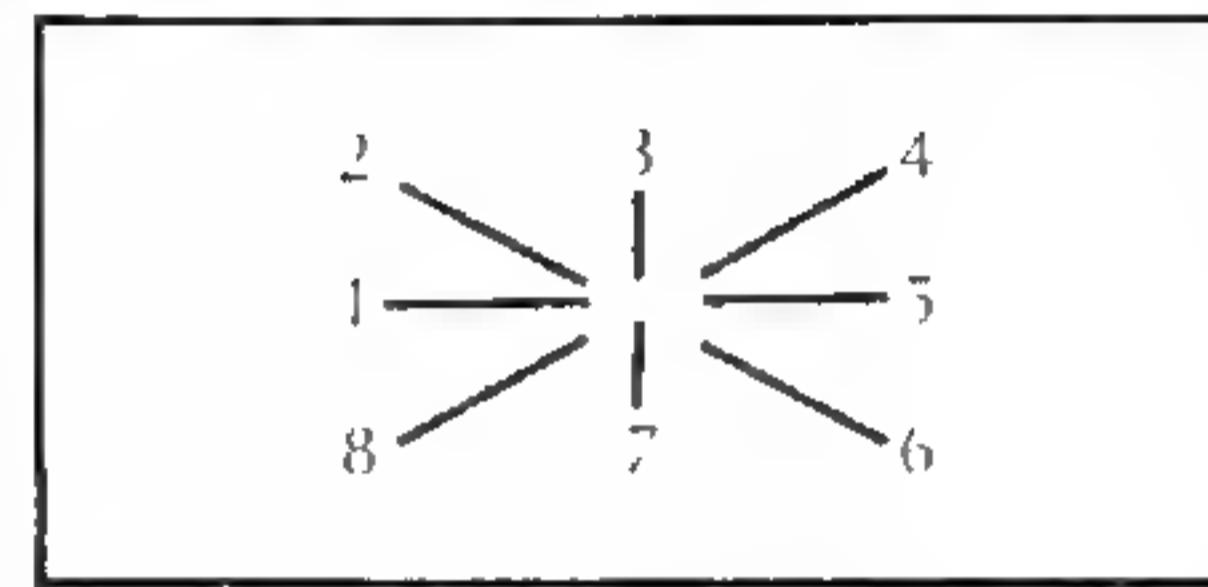
Documentation rates the printed matter that comes with the game. It notes whether the instructions are clear, comprehensive and easy to use, whether the machine configuration requirements are spelled out, and looks for such information as how to load the program, use the keyboard, and restart the game.



Player 1. But for a fast moving, practice game, it's fun to play alone and play both roles.

Teeing Off

Providing 64 random greens, the 18 hole game asks each player to ENTER the direction in which the ball should be hit and the amount of power to put into the swing. You use the number keys to communicate these shot specifications to the computer. The power of each stroke ranges from 0 (soft) to 9 (hard), and there are 8 directions in which the ball can be hit (see diagram). Until you have played the game several times, you may want to keep this diagram close to your console.



The game simulates some of the pleasures and challenges of outdoor golf. Rather than using a golf cart, you move from green to green by rolling up the old green and scrolling in the new. And as in real golf, you experience the calming effect of watching the ball float in its trajectory. You are not given the par for each hole, but there is a 9-stroke limit which, if reached, will inspire a low-register "Uh-oh" from the computer.

Par for the Course

Because the 18-hole course is different for each game, you won't be able to replay your favorite course as you can in outdoor golf. This built-in course variation does, however, keep you thinking all the time. Golf is a game that requires strategy, as well as a balance of aim and power. Mini-Golf's varied course provides good practice in these essential elements of the game. If you hit the ball in the right direction but with too much or too little force, it will take more "strokes" to reach the cup.

Most of the game is quite realistic, and as you play the course, you can imagine yourself at the Master's Tournament. But your fantasy comes to a halt when you encounter a sand trap. These orange blotches may resemble sand traps, but they actually function more like trees along a fairway. Your ball cannot land in these traps, but it can ricochet off the sides. If you put the sand traps to use in this way (the best technique we found for getting a hole in one, by the way), the game resembles miniature golf or bumper pool more than the big course variety.

Fore Score

Along with your view of the hole, the screen displays the score in two ways. It shows each player's stroke count per hole and the subtotal as the game progresses. Looking at the screen display, you can easily tell whose turn it is, how each player is doing, and whether each player im-

proves as the game goes on. In the example below it is MI's turn (as indicated by the 0) to try Hole 5. She is ahead now and has decided to hit her ball in direction 4 with a power of 3.

HOLE	5	DIR	4	PWR	3
P 1	Y R	MI			
1	5	3			
2	9	6	3		1 8

The screen can display the number of strokes per individual hole for only nine holes at a time, but your cumulative score remains on the screen and reflects your changing total throughout the 18-hole game.

Jogging Your Mind

Mini-Golf won't give you any physical exercise, but it will give your mind a good workout. It is not an arcade-type game geared for speed and scores in the thousands. It is a game that calls for precision and a geometrical understanding of how to set up a shot. What makes Mini-Golf mentally exciting is that the game doesn't get more sophisticated, you do! It is the same as regular golf in that improving your score depends on your judgment of distance and stroke force. The game remains a challenge as you strive to improve your handicap.

If you have a great game going and you make a typing mistake, don't lose heart. There is a built-in error-handling safeguard so that a typing mistake won't ruin your game. After typing in the direction of your shot and deciding that the number you typed is wrong, all you need to do is press FCTN 9 before typing the power number. This erases the mistake so you can start over. Once the power number has been typed in, however, the ball automatically begins to move. The game might be improved if you had an opportunity to fix a power mistake as well as a directional one. Perhaps having to press ENTER when you're ready to hit the ball would allow time to use FCTN 9 to fix power errors.

Mini-Golf is a challenge to play, but it is easy to use: You will find all the necessary documentation on the screen. When you have won the round of 18 holes, the computer declares you the winner and prints the number of strokes by which you won. It would have been nice if the sound and graphics capabilities of the TI-99/4A had been utilized more fully with at least a musical fanfare at the end. But even without such elaborate rewards, playing Mini-Golf on a rainy day sure beats the old putt-the-ball-into-the-hole-on-the-floor routine. In fact, your console-ation course may become one of your favorite places to play! The price of the tape or diskette is certainly small compared to a country club membership fee or the price of paying a caddy. So, let it rain—you've got it made because you can play Mini-Golf on your 99/Fore A.

SOFTWARE OUTLET for TI-99/4 (A)

WILDCATTING - Drill & strike it rich, if you dare. A different type strategy game. 3,C,B \$14.95

STRATEGY PK#1 - 2 Games Roman Checkers & Frame Up. You need wits & strategy. 3,C,B \$19.95

CAVERN QUEST - You venture through mysterious caverns in search of hidden treasure. Obstacles & foes multi-screen action. 1,C or D,XB \$19.95
Buy any 2 Moonbeam Programs, receive 1 free—plus Intro Special
Expires Aug. 1, 1983

STRIKE FORCE 99 - Exciting 3-D, Destroy the Cryolian death ship. 1,C or D,XB \$19.95

KONG - You must see it to believe it. 6 screens, all different like arcade game. 2,C or D,XB \$15.00

FROGGY - Cross traffic lanes then river logs. Action fast & smooth. Sound & music. 2,C or D,XB \$9.95
Each game pak only 26.95

Pak/1 - 5 games, including Froggy & Baseball, 2,C,D,XB
Pak/3 - Kong, Bouncer, Romeo, 2,C,D,XB

Intro Special M.W.RUTH CO., Dept. 963
1 items deduct 5% 510 Rhode Island Ave.
2 items deduct 10% Cherry Hill, N.J. 08002
VISA,MASTER-honored (609) 667-2526

C=cass., D=disk, XB=extended basic, B=basic
1=Moonbeam Software 2=Extended Software Co. 3=Image
We stock what we sell, for fast delivery.

Dealers
Welcomed
Free
Catalog

RING DESTROYER



Highest-quality Extended BASIC game program—automatically converts to arcade-action MACHINE LANGUAGE program when you add the Expansion RAM to your TI home computer system.

Also available from REPUBLIC SOFTWARE:

- **INTERCEPTOR**—a fast-action console BASIC game. Joysticks optional.
- **UTILITIES I**—console BASIC, Extended BASIC, and Assembly Language point-ploiting and screen dump routines; disassembler; and create-your-own-words speech utility for Extended BASIC.

See your dealer or order directly from REPUBLIC. RING DESTROYER, UTILITIES I, and INTERCEPTOR are each available for \$19.95. Please specify disk or cassette. Phone (202) 978-3554 to place your order and we will reduce the price of your order by \$2.00 to pay for the call. VISA and Mastercard welcome. For your convenience, our order lines are open from 1 to 8 pm EDT, Monday through Friday.

REPUBLIC SOFTWARE
P.O. Box 23042 • L'Enfant Plaza
Washington, D.C. 20024



THE STRAIGHT FLUSH OF VICTORY

A Review of Challenge Poker By Judy Sanoian

Name:	Challenge Poker
Program Type:	Card game
Language:	TI BASIC
Distributor:	Pewterware Computer Software P.O. Box 503 Gulf Breeze, FL 32561
Price:	\$10.00
System Requirements:	Cassette Recorder
	Poor Fair Good Excellent
Game Performance	
Engrossment	
Documentation	

Another Saturday night alone. What's it gonna be? You could watch that *Love Boat* rerun on TV or leaf through your special "Spring Starlets" issue of *People* magazine. Or maybe you should drive across town and pick up the new Norman Mailer novel everyone is talking about. But you don't feel like leaving the house. You don't even feel like getting dressed. What you really want to do is play a game, but you're sick of Solitaire and you want something more mentally challenging than those "hit the button when you see-the-alien" computer games.

Pewterware Computer Software has the solution to the solo game player's blues.

They present *Challenge Poker*, an entertaining combination of Bingo, Poker Solitaire, and Tic Tac Toe that will challenge (if not frustrate) the most keen intellect. This game may sound easy, but you will soon find out it is anything but

The screen comes on with a Bingo-style, grid gameboard with P-O-K-E-R across the top and the numbers 1-5 down the left side. The computer presents one card from the deck with each turn and you must place it somewhere on the grid. As with most games, the goal is to amass points; you do it by arranging the cards in horizontal, vertical and diagonal rows of straight flushes, full houses, fours of a kind, straights, threes of a kind, and double pairs.

Strategist's Delight

Challenge Poker is, first and foremost, a game of strategy. There are just 25 squares on the grid so you can only count on half the deck being dealt. (As in Bingo, there is a wild card in the center.) You must arrange the cards so that your horizontal row of spades (a potential flush) will intersect to complete the straight you have almost formed on the vertical row to the right. But don't pin all your hopes on getting the king of spades—he may never appear. While the half deck factor adds to the challenge of the game, it can also prove frustrating for those who want to

engineer elaborate designs. It would be nice to be able to choose a "pass" option so that you could hold out for that one card that will complete the "trip e-way, straight flush, full house, four of a kind" you've been carefully plotting.

While *Challenge Poker* can be played with as many as four players, we would advise against it for a couple of reasons. First, because the game is in BASIC, you must wait after each turn for the computer to s-l-o-w-l-y change from your screen to that of your opponent. This was a big yawn with just two people and would be extremely tiresome with three or four. Second, because both players are dealt the same cards (and can see each other's screens), there may be a tendency for the weaker strategist to follow the stronger opponent's game plan. Imitation may be the sincerest form of flattery, but it makes for the dullest form of competition.

If you really want to play with an opponent, you can agree not to look at her screen and vice versa. We found, however, that the game is best played as a solitary endeavor. Rather than adding the spark of competition, an opponent turned out to be merely an unwelcome distraction. We had separate game boards, so we weren't really playing *against* each other, and waiting for her to take her turn (and for the board to change) interfered with concentration and slowed the pace of the

Continued on p. 71

GAMWARE

BUFFET

ESTABLISHED FOR THE 99/4A

Aardvark

By Patrick Pelletier

12108 Pointe
Montreal H3J 3M3
P. Q. Canada

An ant's work is never done. What with tunneling all morning, and gathering food all afternoon - then tucking the juicy morsels away to be eaten later. It's enough to exhaust anyone. And when night comes to your African grassland home do you think you can finally relax and have a bite to eat? No! Just as you are ready to mosey up to the storage cell to enjoy your food, a large blue figure casts its shadow over your anthill. Calitously, you begin to make your way through the labyrinthine tunnels toward your food. Although you cannot see the aardvark lurking at your hill's entrance your ant sensors can detect the pounding of his huge tail. You can almost feel it as he strikes it on the ground each time he extends his long sticky tongue in search of you and your fellow ants. Quick! Hide under that mound of sand over there! Do it now or he'll give you an aardvarkish lick and have you for dinner! Well, you got by him that time. Just a few more passages and you'll have your own meal. Can you out turn and out twist your pursuer's devious extensible tongue? Oh no! There's that tongue again, poking around the corner and sliding right over your head... a close call. Now to go through that last passageway and finally... food! Ha! You've made it! But what about the rest of the hungry ants waiting their turn? The aardvark is smart and fast...

The Name of the Game

Lat before being eaten - that is your goal in this game of survival. Using a joystick you guide six hungry ants to the food they've set aside. The ravenous aardvark guided by the computer, will eat the six ants if they don't move quickly and carefully enough. Each time an ant moves, it has about 4 seconds before the eager aardvark comes after him, extending his long tongue down into the maze. If the ant successfully outwits the pursuing anteater and gets to the food, he gobbles up the food to a reward tone. If, on the other hand, the aardvark succeeds in making a meal of the ant, he celebrates with graphically obvious delight as he munches his meal.

This Extended BASIC version of hide and-seek is fun for even the youngest joystick jockey. Its rules and goals are simple, yet the random movements of the aardvark's menacing tongue make it challenging for older players as well. With six ants to move through the anthill, family members can play together with each player maneuvering one or the ants toward the food, working as a team to outwit the aardvark.

The Score and More

The game ends either when the aardvark is full (having eaten all the ants), or when the ants have eaten all their food. The screen will display the scores for the aardvark and the ants separately, so you can determine which species has survived and which has been eaten up (ants) or starved to death (aardvark).

Aardvark has many endearing features. The screen is entertaining to look at whether you are playing or on the side lines patiently waiting your turn. The graphics were programmed artistically with a captivating sense of humor.

This game could also serve many purposes in a classroom. A teacher might use it as a simple reward for work well done or as a vocabulary enriching tool in a foreign language class. No, you won't learn to speak like an aardvark, but you may learn to order ants in a French restaurant! This excellent program, sent to us by a twelve-year-old Montreal programmer, displays the instructions and scores in both English and French! A bilingual aardvark in pursuit of bilingual ants. *C'est si bon!*

EXTENDED BASIC

Aardvark Explanation of the Program

Line Nos.

100-170	Program header.
180-270	Display instructions.
280-490	Initialize variables, color, and graphic characters.
500-620	Display playing screen.
630-690	Read joystick and branch to subroutines.
700-770	Data for the screen display.
780-1030	Check movement limits.
1040-1070	Move the ant
1080-1150	Ant eats the food.
1160-1270	Ant gets eaten by the anteater.

Continued on p. 32

AARDVARK



Space Zapper

By Sam Scott

10 Julian Street
Culver Place, ON
Canada K7C 3W8

You are in a lone space station slowly orbiting Mars. Suddenly you are attacked from the left by a green enemy ship. Before you have time to wonder who the enemy is, what his interests might be, or how many of him there are, you are hit from the right, and your shield power begins to weaken.

You hastily press your rotating blue space zapper into action. The enemy continues its laser attack on your station from the left, the right, from above and beneath you. You rapidly move your zapper from position to position to answer each new enemy barrage.

If you can defend yourself by shooting down the enemy's ships before he destroys your shield power, you will survive. If your shield power falls to 1, then your Space Zapper station will explode into smithereens.

Aim and Fire

Your silvery, geometric Space Zapper station dominates center screen. The green enemy ships come at you, one at a time from the perimeter. Before you fire at them, you must first use the arrow keys

to correctly position your zapper in one of the four directional gun mounts on your craft. When the zapper fires, a beam goes straight to the green enemy ship and annihilates it.

There's no need to calculate altitudes or relative positions in order to make a hit. You simply press the key for the appropriate direction in response to the threat of enemy attack, then hold the key down to fire. Your Space Zapper responds most quickly if you shift direction in 180° increments (east to west, north to south) rather than in 90° moves. But enemy attacks from unexpected positions can force you to go from north or south to east or west.

Any time the enemy scores a hit, your station's shield power diminishes. It can dwindle from a high of 100 to a low of 1, which ends the game. You know it's close to the explosive end when your shield power gets down to 15.

Your falling shield power is displayed in a countdown at the top of the screen. Your enemy hits are reported at the end of the game, after the announcement, "Your Space Zapper has been broken down into its separate molecules."

Zapper's Origins

Thirteen-year-old Sam Scott based this 11 BASIC game program on an arcade game, *Space Zap*. The graphics are large, bright, and spare, and the elements of play are simple: shoot or suffer progressive deterioration. The instructions for *Space Zapper* are straightforward, and so is the method of play—there's no problem with

temperamental imprecise joysticks; high scores grow out of quick responses to unpredictable enemy attacks.

[Note: This game is similar to *Battle Star*, an Extended BASIC game published in the August-September, 1982, issue of 99'er. *Battle Star* featured a smaller, centrally placed cruiser which had to dispose of both the nuclear missiles and the actual launching ships of the enemy. Unlike *Space Zapper*, in which the player fires at enemy ships by holding the direction key down, *Battle Star* requires the player to dispatch first the nuclear missile headed toward the player's cruiser, and then with a second press of the key, the missile launcher itself. (Ed.)

BASIC

Space Zapper Explanation of the Program

Line Nos.

100-190	Program header.
200-830	Define graphics characters
840-990	Display title screen
1000-1070	Display instructions.
1080-1200	Initialize character colors.
1210-1700	Set up playing screen.
1710-1760	Set up variables for the start of the game.
1770-1860	Control the firing of the space station.
1870-2680	Display graphics for the space station's shots.
2690-2760	Randomly choose which alien ship to appear.
2770-2880	Display alien ships.
2890-2980	Subroutine to control when the aliens fire back.
2990-3260	Graphics to display the aliens firing at the space station.
3270-3340	Display the remaining shield power of the space station.
3350-3690	The space station is destroyed. Display the explosion and the end of game message. Start the game over again.

```

100 REM ****
110 REM * SPACE ZAPPER *
120 REM * BY SAM SCOTT *
130 REM * ****
140 REM *
150 REM ****
160 REM
170 REM 99'ER VERSION 2.8.1
180 REM
190 REM ** CHARACTER CODES
200 CALL CLEAR
210 OPTION BASE 1
220 DIM A$(158)
230 DATA FF7F3F1F0F070301,0103070F
240 1F3F7FFF,80C0E0F0BFCFFF,FFFF
250 FCFC8F0E0C0B0,FFFFFFFFFFFF,FFFF
260 000000000000FFFF
270 DATA FFFF
280 RESTORE 230
290 FOR F=40 TO 44
300 READ A$(F)
310 CALL CHAR(F,A$(F))
320 NEXT F
330 RESTORE 230
340 FOR F=96 TO 102

```

Continued on p. 29

LEARN TO FLY!



REVIEWED IN JAN. 99'er

The Dow 4 Gazelle is a simulation of a 4-place, single-engine, high performance aircraft, which will provide fun and challenge as you learn to fly. A high quality program written by a professional programmer/analyst who is also an experienced instrument-rated pilot, the Gazelle is a real-time simulation which responds rapidly to the controls (within one second on the average).

On your screen you see the instrument panel, which has 10 dials with moving pointers and 11 indicator lights. The plane is flown with the joystick, while the keyboard is used to control power, flaps, fuel, etc.

The manual contains 30 pages of text, a glossary, and seven full page figures. It introduces you to the art of flying and leads you, a step at a time, from novice to professional. Learn to take-off, land, navigate, fly instrument approaches, and more. If you get into trouble, you can freeze the action in case you need time to assess your situation. Sound effects add to realism.

This program pushes the TI-99/4(A) to its limits. For both 99/4 and 99/4A. Does not require anything other than a joystick and cassette recorder.

Send \$30.00 to:

John T. Dow

6360 Caton

Pittsburgh, PA 15217

PA residents add 6%

DISK DRIVES

NEW, SINGLE SIDED,
SINGLE OR DUAL DENSITY
INSERT DIRECTLY INTO
PERIPHERAL EXPANSION
BOX

\$185.00

\$175.00 ea/10

Check/money order/C.O.D.

Include \$4.00/drive P & H

PRINTERS

Prowriter 8510.....call

Computer Peripherals Unlimited

P.O. Box 753

Brigham City, Utah 84302

(801) 734-2570

PRESENTS
QUALITY
CASSETTE
SOFTWARE
FOR THE TI-99 4A!

ATLANTIC CITY GAMES (VOL 1) BLACKJACK SLOT MACHINE

Play at Casino favorites in one tape Blackjack \$14.00 game with doubling, splitting, pair up or no limit. Slot machine is great fun for the whole family. Practice your hot line systems! Both games in TI-BASIC. No extra equipment needed.

ATLANTIC CITY GAMES (VOL 2) CRAPS ROULETTE

Play the great Casino games! Both games feature graphics showing all of the standard bets. Both games in TI-BASIC. No extra equipment needed.

SPACE SALVO

Engage in a laser war on New York City. You defend the World Trade Center with a keyboard. You move coordinates of laser beam in x & y. Both you and the computer fire lasers and track each other. No joysticks needed.

COCKROACH RACES

Play your cockroaches in a 5x track race with obstacles. Control with keyboard. Great party game for 2-4 players. Tap on the screen to move. TI-BASIC & one in EXTENDED BASIC.

ALL PROGRAMS FEATURE HIGH RESOLUTION GRAPHICS AND COME WITH COMPLETE INSTRUCTIONS

Send check or money-order to

JERSEYWARE MICROCOMPUTER SOFTWARE

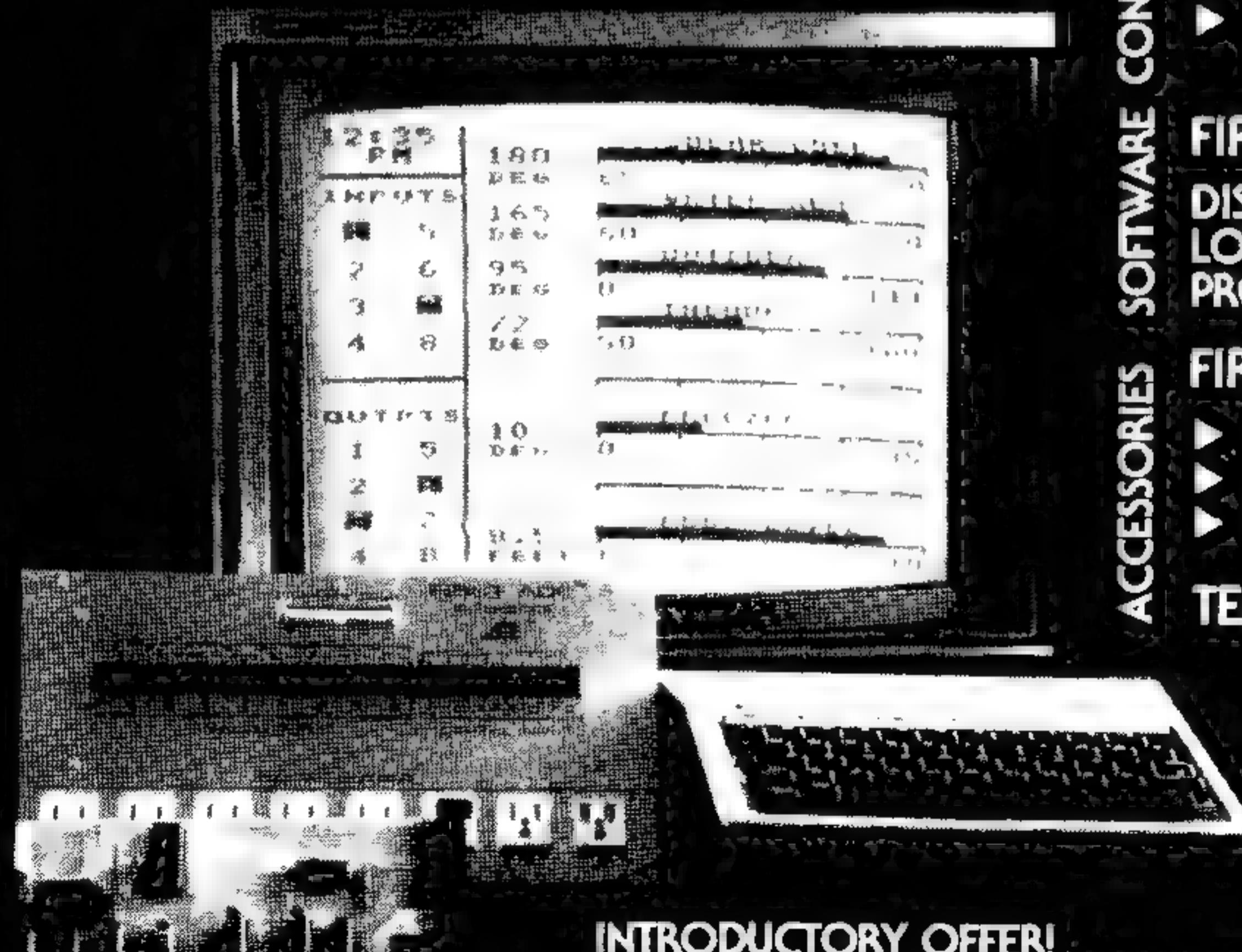
P O BOX 482

FORDS, N. J. 08863

Dealer inquiries welcome

FIRST ADE™ FOR YOUR 99/4A!

COMPLETE 8 BIT DATA ACQUISITION AND CONTROL



ACCESSORIES SOFTWARE CONTROL CARD

FIRST ADE™ FEATURES —

- 8 ANALOG INPUT CHANNELS
- 8 DIGITAL INPUT CHANNELS
- 8 DIGITAL OUTPUT CHANNELS
- REAL TIME CLOCK W/BATTERY
- 3 MONTH WARRANTY
- REQUIRES 32K & EXT. BASIC

FIRST ADE™ VERSION 1.1

DISK BASED/MENU DRIVEN
LOGIC FUNCTIONS
PROGRAMMABLE SETPOINTS

FIRST ADE™ INTERFACE

- 8 120V 6A RELAYS/RECEPTACLES
- 8 ANALOG INPUT TERMINATIONS
- 8 DIGITAL INPUT TERMINATIONS

TEMPERATURE PROBES

A/D ELECTRONICS
Box 26357
Sacramento, California
95826 (916) 363-8331



INTRODUCTORY OFFER!
\$199.95 ▲ CONTROL CARD & FIRST ADE 1.1
79.95 ▲ FIRST ADE INTERFACE
19.95 ▲ TEMPERATURE PROBE
CASHIER'S CHECK / M.O. / C.O.D.

BEST SOFTWARE

The Best Software at the Best Price.
All Programs By Professional Programmer

Special Deal:

BUY ANY 2 PROGRAMS,
CHOOSE 1 MORE FREE!

FROGGERY:

10 Skill Levels, Jump Your Frog Home Before Time Runs Out. Great Graphics and Sound. \$10.

BLADE RUNNER 2020:

Police the Skies. Shoot Only the Red Robot Ships. Watch Out For Evil Star Raiders. \$15.

ROBOTRON:

A Robot Chase Game That Will Put You Into A Frenzy and Drive You Beserk. \$15.

FREEWAYS:

Can Your Chicken Cross the Freeway at 5 PM? 5 Freeways. \$10.

STAR TREK 2:

Advanced Graphics and Sound Improve on This Old Classic. \$5.

All programs are in Extended Basic for the TI99/4A. Joystick required.

All programs on cassette.

Send Check or Money Order to:

BEST SOFTWARE

P O Box 22446
Baltimore, MD 21203

COMPUTER CONNECTION I

180 day warranty printers

Gemini 10"	\$350
Gemini 15"	\$550
4K Serial board	\$70

90 day warranty printer

Microline 83A	\$755
Required cable for printers	\$40
*Rewired for TI 99/4A	
(See TI99'er Feb'83 printer review)	

1 year warranty monitor

Amdek Color I Monitor	\$286
Required monitor cable	\$20

Normal delivery is 1 to 2 weeks for cashier check & money orders
Personal checks are 10 days longer
Ohio residents add 6.5% Sales tax
Add 3% shipping charge

Mail order to:

COMPUTER CONNECTION I

PO BOX 02453
Cleveland, Ohio 44102
(216) 961-7311

Computer-Ed.

Of
Carmel, NY & Los Angeles, CA

99/4(A) Programs

- K-6 Reading
- K-6 Language Arts
- K-6 Math
- Follow-up Games and Worksheets
- Classroom Tested
- Also Available for TRS-80 Level II

For

FREE Catalogue

Write To:

Computer-Ed.

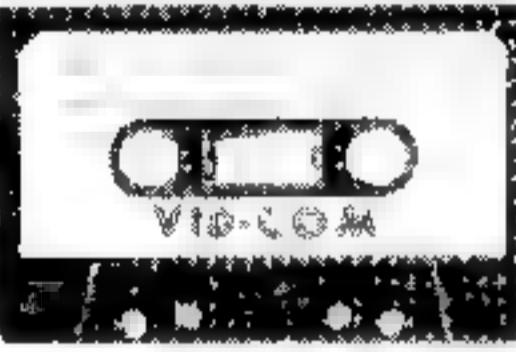
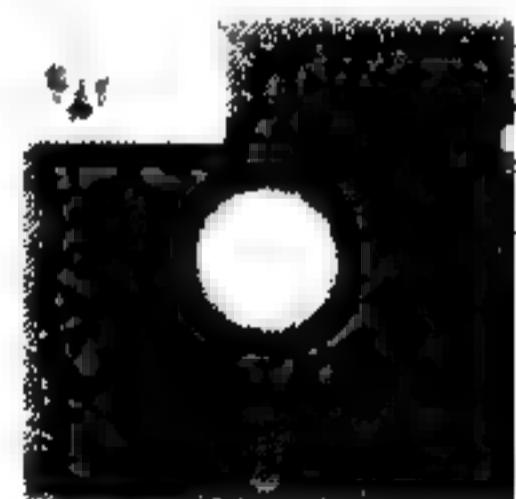
1 Everett Rd.
Carmel, NY 10512

VID-COM VID-COM VID-COM VID-COM VID-COM VID-COM VID-COM VID-COM

VID-COM

1018 E. Philadelphia Street, York, PA 17403

(Mail Order Only)



VID-COM VID-COM VID-COM VID-COM

VID-COM VID-COM VID-COM VID-COM

VID-COM VID-COM VID-COM VID-COM

VID-COM VID-COM VID-COM VID-COM

VID-COM VID-COM VID-COM VID-COM VID-COM VID-COM VID-COM VID-COM

VID-COM VID-COM VID-COM VID-COM VID-COM VID-COM VID-COM VID-COM

VID-COM VID-COM VID-COM VID-COM VID-COM VID-COM VID-COM VID-COM

VID-COM VID-COM VID-COM VID-COM VID-COM VID-COM VID-COM VID-COM

VID-COM VID-COM VID-COM VID-COM VID-COM VID-COM VID-COM VID-COM

VID-COM VID-COM VID-COM VID-COM VID-COM VID-COM VID-COM VID-COM

VID-COM VID-COM VID-COM VID-COM VID-COM VID-COM VID-COM VID-COM

VID-COM VID-COM VID-COM VID-COM VID-COM VID-COM VID-COM VID-COM

VID-COM VID-COM VID-COM VID-COM VID-COM VID-COM VID-COM VID-COM

VID-COM VID-COM VID-COM VID-COM VID-COM VID-COM VID-COM VID-COM

VID-COM VID-COM VID-COM VID-COM VID-COM VID-COM VID-COM VID-COM

VID-COM VID-COM VID-COM VID-COM VID-COM VID-COM VID-COM VID-COM

VID-COM VID-COM VID-COM VID-COM VID-COM VID-COM VID-COM VID-COM

VID-COM VID-COM VID-COM VID-COM VID-COM VID-COM VID-COM VID-COM

VID-COM VID-COM VID-COM VID-COM VID-COM VID-COM VID-COM VID-COM

VID-COM VID-COM VID-COM VID-COM VID-COM VID-COM VID-COM VID-COM

VID-COM VID-COM VID-COM VID-COM VID-COM VID-COM VID-COM VID-COM

'OL' CAN'T CALL IT A GOOD DEAL UNTIL YOU'VE SEEN THEIR LAST CARD . . .

Fact is, not all of the so-called "RS232 interfaces" on the market conform to the EIA RS232C specification. This means that you could get stuck with one that won't work with your printer, modem or other peripheral.

Worse yet, interfaces that require the Mini-Memory module are not directly compatible with TI Basic, Extended Basic, LOGO and other existing software. This means that you won't be able to LIST your programs directly to your printer!

The good news is that there is a product that you can trust. A J International's RS232 interface is guaranteed to be compatible with all existing software and hardware. In fact, we have designed in special features such as a "switch selectable device address" and "soft-coded" VDP offsets so that our product will be compatible with all future hardware, software and programming languages.

What's more, our interface supports more software functions as well more RS232 hardware signals than Texas Instrument's own RS232 card. And since ours is "stand-alone," you don't have to buy a Peripheral Expansion System or HEXBUS™ interface to use it!



Enclose Check/Money Order or provide credit card information.

<input type="checkbox"/> RS232 Interface (User's Manual Included)	\$169.95	
<input type="checkbox"/> User's Manual Only	\$ 14.95	
Name _____		
Address _____		
City _____	State _____	Zip _____
<input type="checkbox"/> Payment enclosed <input type="checkbox"/> VISA <input type="checkbox"/> MASTERCARD		
Card # _____		
Expiration Date _____		
Signature _____		

Sorry - No COD PA Add 6% Sales Tax, Add 5% Shipping Outside U.S.

A J International

4023 Sommers Avenue Drexel Hill, PA 19026
(215) 623-8083

THE 128K MEMORY CARD

We've been shipping our 32K Memory Card in volume, and customers across the country have been calling to praise our product. If you write programs and need more memory **or** if you want to take advantage of large memory programs our **128K Memory Card** may be right for you.

Both cards begin with a quality design by our MIT-trained engineering team and feature:

- The finest components
- Prime integrated circuits from top manufacturers
- A durable metal case that plugs into your Peripheral Expansion Box

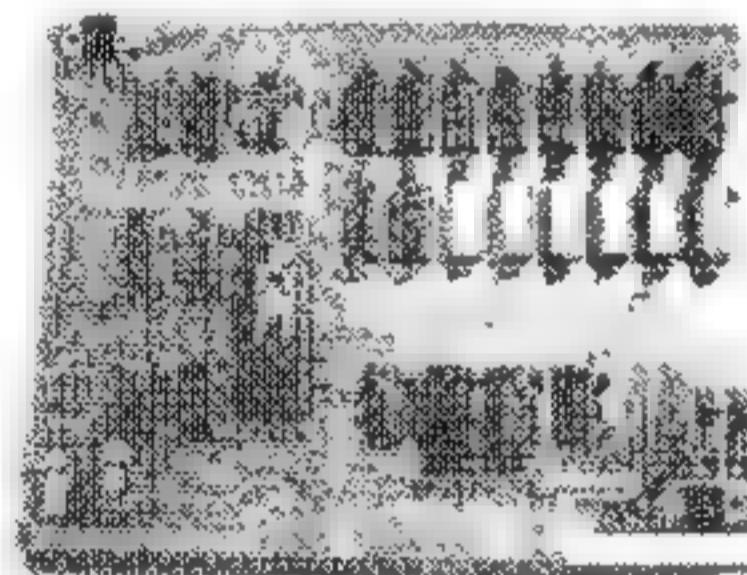
Both the 32K and 128K Memory Card run the same programs as the TI card, including Logo, Pascal, Extended Basic, and Assembler.

Please note that a letter or a phone call will reserve a card for you even if you can't take immediate delivery.

3 month warranty
Prepaid/C.O.D. Add 3% shipping
Calif. residents add 6% sales tax
2-4 weeks for delivery

So now you have a choice*—

- The 32K Memory Card at \$150
- The 128K Memory Card at \$220

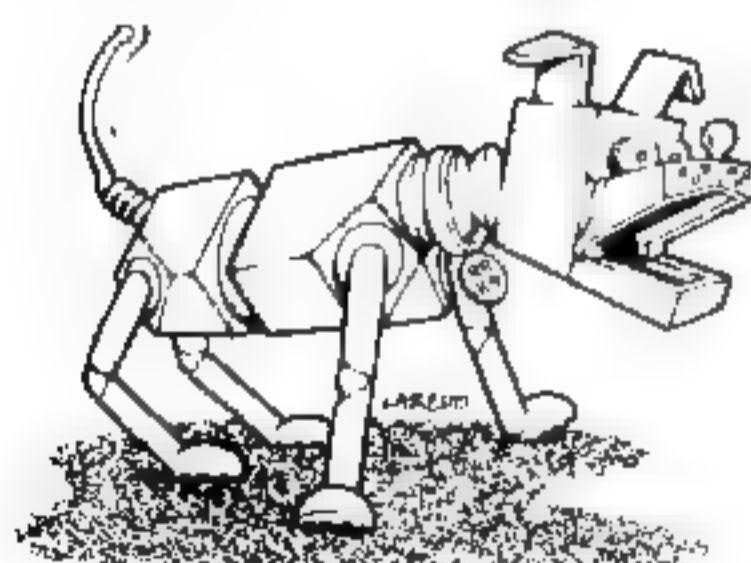


***Introductory Price – Order Now!**

FOUNDATION

74 Claire Way, Tiburon, CA 94920
(415) 388-3840

April's Choice



The people have spoken! The winner of the April B.A.R.C. Back competition is Patricia Swift for her article, *Multiplan Medium: An Introduction to Spreadsheets*. Our hearty congratulations and a \$100 prize go to Ms. Swift.

Zapper . . . from p. 25

```
320 READ A$(F)
330 CALL CHAR(F,A$(F))
340 NEXT F
350 RESTORE 230
360 FOR F=112 TO 118
370 READ A$(F)
380 CALL CHAR(F,A$(F))
390 NEXT F
400 DATA 0018183C3C7E7EFF,FF7E7E3C
3C1818,030303030303030303,CCCC00
C0C0C0C0C0
410 RESTORE 400
420 READ A$(104)
430 CALL CHAR(104,A$(104))
440 READ A$(120)
450 CALL CHAR(120,A$(120))
460 FOR F=105 TO 106
470 READ A$(F)
480 CALL CHAR(F,A$(F))
490 NEXT F
500 FOR F=121 TO 122
510 CALL CHAR(F,A$(F-16))
520 NEXT F
530 CALL CHAR(128,"FFFFFFFFFFFFFFE")
```

Continued

HARVEY'S SPECIAL OF THE MONTH

HARVEY'S BUDGET SYSTEM — Special: \$32. For minimal cassette based /4A systems. Program runs in TI Basic. Reporting is to the monitor. A Thermal Printer is optional. For use by self-employed persons with yearly taxable earnings up to \$120,000. Program allocates sales and other income to reserves for: Cost of sales, personal income taxes, new equipment, and family living expenses. You have to calculate the rates for the system before it may be used initially. To get a current status report, summary totals only affecting those categories are required inputs. Up to 5 sales categories may be established, with a different cost of sales rate for each. Program considers prior year operating loss carryover and standard deductions. I first developed the program for my use, then modified it somewhat for more general application. Write for detailed information. Price: Normally \$35., you get program on cassette tape, detailed instructions and three forms which you may use with the system.

HOW TO CREATE AND MAINTAIN RELATIVE FILES Special: \$45. Programs run in TI Basic on a /4A minimal disk system. (A /4A computer, monitor, disk controller and disk drive.) For programmers wanting to learn how to write using relative files, for either business or home applications. You should be familiar enough with Basic to follow the programming examples given in the text. The disk contains a sort utility primarily for use with relative files. Programs using relative files are the type most popular with businesses today. If you want to be a professional programmer, this is one methodology you will need to know. Text is 65, 8" x 11" pages (daisy wheel printer) of "How To" instructions, program listings, plus a form. The file maintenance program organization and related most popular functions are covered well enough that you should be able to start right off using relative files. The text includes 1983 revisions. Price: Usually \$50., includes a SS,SD floppy disk containing 7 programs, and the text is permanently bound in a nice Duo-Tang folder.

Special prices end July 30. All prices include delivery. Send a Bank or Postal Money Order, and I will ship right away by First Class Mail. No sales to foreign countries. Dealers and Whsle. Distributors: Try me. Free catalog lists other programs. Call or write:

1-803-576-7245

JAMES HARVEY

159 Dover Rd.

Spartanburg, S. C. 29301

Delivery and your satisfaction is guaranteed, so buy with confidence.

TWELVE GAMES FOR \$9.95

Inexpensive TI-99/4A Basic and X-Basic action, memory, and card games feature color, graphics, and sound. Six games require joysticks.

- Command Fighter
- Memory Chips
- Maze Game
- Beginner's Double Oh Hell (Basic and X-Basic)
- Space Station XIII
- Knock Out
- Acey Ducey
- Bells, Lemons, and Diamonds
- Snac Man (X-Basic)
- Alien Invasion (X-Basic)
- Memory Fun (X-Basic)

Send check or money order for \$9.95
(all residents add 6% sales tax)
for user's guide and cassette tape to:

**MICROWORLD'S
Hobbyist Game Pac I**
145 East Norman Drive
Palatine, Illinois 60067

TI 99/4(A) Arcade Games

1 **Hit & Run:** Dodge the Mafia on their own turf! Dazzling graphics and sound effects! BASIC

2 **Krazy Kong:** Just like the arcade! Three screens! Joystick optional X-BASIC

Also Featuring

BASIC	X-BASIC	Special Edition
Supermunch	Laser Baster	X-BASIC
	Air Combat	Mini Logo
	Moon Lander	Misc Composer
	Poultry Pusher	TypeWriter

All programs designed by specially trained N S Y Software technicians. Cassettes only; no disks. Write for free catalog.

Special limited time sale: Buy one program at full price (\$19.00) and get another for only \$12.95. Send check or money order to:

N S Y Software

73-32 136 Street
Flushing, NY 11367
Telephone: (212) 263-8296

Zapper... from p. 29

```

1180 CALL COLOR(1, 1, 1)
1190 NEXT F
1200 CALL COLOR(16, 5, 1)
1210 REM*** SET UP SCREEN
1220 PRINT " SHIELD POWER: 100"
1230 : : : : : : : : : : : : : :
1235 FOR F=3 TO 8
1240 CALL COLOR(F, 12, 1)
1250 NEXT F
1260 FOR F=13 TO 18
1270 CALL VCHAR(10, F, 44, 6)
1280 NEXT F
1290 CALL VCHAR(12, 15, 32, 2)
1300 CALL VCHAR(12, 16, 32, 2)
1310 CALL HCHAR(9, 13, 42)
1320 CALL HCHAR(9, 18, 41)
1330 CALL HCHAR(10, 19, 43)
1340 CALL HCHAR(15, 19, 42)
1350 CALL HCHAR(16, 18, 40)
1360 CALL HCHAR(16, 13, 43)
1370 CALL HCHAR(15, 12, 41)
1380 CALL HCHAR(10, 12, 40)
1390 CALL HCHAR(9, 14, 45)
1400 CALL HCHAR(9, 15, 144, 2)
1410 CALL HCHAR(9, 17, 146)
1420 CALL HCHAR(8, 15, 147)
1430 CALL HCHAR(8, 16, 148)
1440 CALL HCHAR(11, 19, 138)
1450 CALL VCHAR(12, 19, 136, 2)
1460 CALL HCHAR(14, 19, 137)
1470 CALL HCHAR(12, 20, 140)
1480 CALL HCHAR(13, 20, 139)
1490 CALL HCHAR(16, 17, 130)
1500 CALL HCHAR(16, 15, 128, 2)
1510 CALL HCHAR(16, 14, 129)
1520 CALL HCHAR(17, 16, 132)
1530 CALL HCHAR(17, 15, 131)
1540 CALL HCHAR(14, 12, 153)
1550 CALL VCHAR(12, 12, 154, 2)
1560 CALL HCHAR(11, 12, 152)
1570 CALL HCHAR(13, 11, 155)
1580 CALL HCHAR(12, 11, 156)
1590 CALL HCHAR(21, 15, 104, 2)
1600 CALL HCHAR(4, 15, 120, 2)
1610 CALL HCHAR(12, 1, 96)
1620 CALL HCHAR(13, 1, 97)
1630 CALL VCHAR(12, 2, 100, 2)
1640 CALL HCHAR(12, 3, 98)
1650 CALL HCHAR(13, 3, 99)
1660 CALL HCHAR(12, 30, 115)
1670 CALL HCHAR(13, 30, 114)
1680 CALL VCHAR(12, 29, 116, 2)
1690 CALL HCHAR(12, 29, 113)
1700 CALL HCHAR(13, 29, 112)
1710 REM*** BEGIN GAME
1720 LAST=16
1730 L=9
1740 SHIELDS=100
1750 N=0

```

```

1760 RANDOMIZE
1770 ON INT(RND*2)+1 GOTO 1780, 2700
1780 P=0
1790 SHIP=0
1800 CALL KEY(1, K, S)
1810 IF K+1=1 THEN 1880
1820 IF K=2 THEN 2060
1830 IF K=3 THEN 2290
1840 IF K=5 THEN 2520
1850 IF SHIP>0 THEN 2900
1860 GOTO 1770
1870 REM*** FIRE DOWN
1880 IF LAST=13 THEN 1920
1890 CALL COLOR(LAST, 1, 1)
1900 CALL COLOR(13, 5, 1)
1910 LAST=13
1920 CALL VCHAR(18, 15, 133, 3)
1930 CALL SOUND(-100, -5, 20)
1940 CALL VCHAR(18, 16, 134, 3)
1950 CALL SOUND(100, -5, 20)
1960 CALL VCHAR(18, 15, 32, 3)
1970 CALL VCHAR(18, 16, 32, 3)
1980 IF P<>4 THEN 1850
1990 N=N+1
2000 CALL HCHAR(21, 15, 45, 2)
2010 CALL SOUND(500, -6, 10)
2020 CALL COLOR(10, 1, 1)
2030 CALL HCHAR(21, 15, 104, 2)
2040 GOTO 1770
2050 REM*** FIRE LEFT
2060 IF LAST=16 THEN 2100
2070 CALL COLOR(LAST, 1, 1)
2080 CALL COLOR(16, 5, 1)
2090 LAST=16
2100 CALL HCHAR(12, 4, 157, 7)
2110 CALL SOUND(-100, -5, 20)
2120 CALL HCHAR(13, 4, 158, 7)
2130 CALL SOUND(100, -5, 20)
2140 CALL HCHAR(12, 4, 32, 7)
2150 CALL HCHAR(13, 4, 32, 7)
2160 IF P<>1 THEN 1850
2170 N=N+1
2180 CALL HCHAR(12, 1, 45, 3)
2190 CALL HCHAR(13, 1, 45, 3)
2200 CALL SOUND(500, -6, 10)
2210 CALL COLOR(9, 1, 1)
2220 CALL HCHAR(12, 1, 96)
2230 CALL HCHAR(13, 1, 97)
2240 CALL VCHAR(12, 2, 100, 2)
2250 CALL HCHAR(12, 3, 98)
2260 CALL HCHAR(13, 3, 99)
2270 GOTO 1770
2280 REM** FIRE RIGHT
2290 IF LAST=14 THEN 2330
2300 CALL COLOR(LAST, 1, 1)
2310 CALL COLOR(14, 5, 1)
2320 LAST=14
2330 CALL HCHAR(12, 21, 141, 7)
2340 CALL SOUND(-100, -5, 20)
2350 CALL HCHAR(13, 21, 142, 7)
2360 CALL SOUND(100, -5, 20)

```

TI 99/4A Cassette Software

Andromeda

Action Packed!
High Resolute Graphics

Your mission, Captain, is to destroy the enemy with your limited fleet and protect your base ship.

Game requires TI extended basic module and joystick

\$20.00 and \$2.50 shipping and handling.

Money Order only.

I & I Computer Programming Ltd.
Box 447, Holden, Alberta, Canada
T0B 2C0

Zapper

```

2370 CALL HCHAR(12,21,32,7)
2380 CALL HCHAR(13,21,32,7)
2390 IF P<>3 THEN 1850
2400 N=N+1
2410 CALL HCHAR(12,28,45,3)
2420 CALL HCHAR(13,28,45,3)
2430 CALL SOUND(500,-6,10)
2440 CALL COLOR(11,1,1)
2450 CALL HCHAR(12,28,113)
2460 CALL HCHAR(13,28,112)
2470 CALL VCHAR(12,29,116,2)
2480 CALL HCHAR(12,30,115)
2490 CALL HCHAR(13,30,114)
2500 GOTO 1770
2510 REM*** FIRE UP
2520 IF LAST=15 THEN 2560
2530 CALL COLOR(LAST,1,1)
2540 CALL COLOR(15,5,1)
2550 LAST=15
2560 CALL VCHAR(5,15,149,3)
2570 CALL SOUND(-100,-5,20)
2580 CALL VCHAR(5,16,150,3)
2590 CALL SOUND(100,-5,20)
2600 CALL VCHAR(5,15,32,3)
2610 CALL VCHAR(5,16,32,3)
2620 IF P<>2 THEN 1850
2630 N=N+1
2640 CALL HCHAR(4,15,45,2)
2650 CALL SOUND(500,-6,10)
2660 CALL COLOR(12,1,1)
2670 CALL HCHAR(4,15,120,2)
2680 GOTO 1770
2690 REM PICK ENEMY TO APPEAR
2700 RANDOMIZE
2710 F=INT(RND*4)+1
2720 ON P GOSUB 2770,2800,2830,2860
2730 SHIP=1
2740 RANDOMIZE
2750 T=INT(RND*5)+1
2760 GOTO 1800
2770 CALL COLOR(9,3,1)
2780 L=9
2790 RETURN
2800 CALL COLOR(12,3,1)
2810 L=12
2820 RETURN
2830 CALL COLOR(11,3,1)
2840 L=11
2850 RETURN
2860 CALL COLOR(10,3,1)
2870 L=10
2880 RETURN
2890 REM*** DOES ENEMY
*** FIRE?
2900 SHIP=SHIP+1
2910 IF SHIP>1 THEN 1890
2920 REM*** ENEMY FIRES
2930 ON F GOSUB 2990,3060,3130,3200
2940 SHIELDS=SHIELDS-INT(RND*10+5)
2950 IF SHIELDS<1 THEN 3360
2960 GOSUB 3280

```

Cape Cod Golf

9 Holes of Exciting Golf for
1-4 Players with Realistic
Graphics and Action

REGULAR TI BASIC

Joysticks Required
Available only on Cassette

\$15.00

(NY) 1.250-000-1-500-1-1-1

Harry P. Richard
18 Fruitwood Dr.
Burnt Hills, NY 12027

```

2970 CALL COLOR(L,1,1)
2980 GOTO 1760
2990 CALL HCHAR(12,4,101,7)
3000 CALL SOUND(-100,-5,20)
3010 CALL HCHAR(13,4,102,7)
3020 CALL SOUND(100,-5,20)
3030 CALL HCHAR(12,4,32,7)
3040 CALL HCHAR(13,4,32,7)
3050 RETURN
3060 CALL VCHAR(5,15,121,3)
3070 CALL SOUND(-100,-5,20)
3080 CALL VCHAR(5,16,122,3)
3090 CALL SOUND(100,-5,20)
3100 CALL VCHAR(5,15,32,3)
3110 CALL VCHAR(5,16,32,3)
3120 RETURN
3130 CALL HCHAR(12,21,117,7)
3140 CALL SOUND(-100,-5,20)
3150 CALL HCHAR(13,21,118,7)
3160 CALL SOUND(100,-5,20)
3170 CALL HCHAR(12,21,32,7)
3180 CALL HCHAR(13,21,32,7)
3190 RETURN
3200 CALL VCHAR(18,15,105,3)
3210 CALL SOUND(-100,-5,20)
3220 CALL VCHAR(18,16,106,3)
3230 CALL SOUND(100,-5,20)
3240 CALL VCHAR(18,15,32,3)
3250 CALL VCHAR(18,16,32,3)
3260 RETURN
3270 REM*** SHIELD POWER
*** READOUT
3280 SHIELDS$=STR$(SHIELDS)
3290 CALL HCHAR(2,22,32,4)
3300 FOR F=22 TO 21+LEN(SHIELDS$)
3310 B$=SEG$(SHIELDS$,F-21,1)
3320 CALL HCHAR(2,F,ASC(B$))
3330 NEXT F
3340 RETURN
3350 REM*** EXPLOSION OF
*** SPACE ZAPPER
3360 CALL SOUND(-1000,-7,28)
3370 CALL HCHAR(12,15,45,2)
3380 CALL HCHAR(13,15,45,2)
3390 CALL SOUND(-1000,-7,20)
3400 CALL HCHAR(11,14,45,4)
3410 CALL VCHAR(12,17,45,3)
3420 CALL HCHAR(14,14,45,3)
3430 CALL VCHAR(12,14,45,2)
3440 CALL SOUND(-1000,-7,10)
3450 CALL HCHAR(10,13,45,6)
3460 CALL VCHAR(11,18,45,5)
3470 CALL HCHAR(15,13,45,5)
3480 CALL VCHAR(11,13,45,4)
3490 CALL SOUND(-1000,-7,0)
3500 CALL HCHAR(9,12,45,8)
3510 CALL VCHAR(10,19,45,7)
3520 CALL HCHAR(16,12,45,7)
3530 CALL VCHAR(10,12,45,7)
3540 CALL SOUND(-1000,-7,0)

```

Continued on p. 36

GRAPHICAL ADVENTURES

Complete advantage of TI Extended Basic's **color graphic** and **sprite** capabilities has been taken in the development of four excellent graphical adventures. Maneuver a graphical adventurer around inside a window containing both graphical and word objects. Type **two-word commands** in the form of verb-noun. Exit the window on any side possible and a new window will quickly assemble so the adventurer can continue on his journey. These adventures are extensive and take a long time to complete. Therefore, two of the adventures have a **save-game feature**. All adventures come with instructions and a clue sheet. For 99/4 or 99/4A.

Medieval Graphical Adventure:

Explore a castle, cave, and dragon valley. Meet Merlin and a witch. Gather up to 18 items, such as, sword, rope, key, and herb to help you during your journey. The program understands over two dozen verbs. Save Game Option. Recommended for intermediate or advanced adventurer. \$18.00

Egyptian Graphical Adventure:

You've been sent back in time to collect Egyptian treasures to save the American government from bankruptcy. Explore a tomb, pyramid and time machine. Meet 3 Egyptian gods. The program understands over twenty verbs. Save Game Option. Recommended for intermediate or advanced adventurer. \$18.00

Sundial Island I & II:

Shot down over a Japanese-inhabited island in World War II, your mission is to free your co-pilot from enemy captivity by outwitting island natives, Japanese soldiers and other hostile island inhabitants. This extensive adventure had to be made into two parts. Recommended for advanced adventurer. \$24.00

All 3 of the above. \$48

Graphical Adventure:

Collect 6 keys and gold while searching for an exit to a three-level maze complete with robbers, devils, dragons, traps, doors, and much more. No words in this adventure. This adventure is for all levels of adventurers. \$12.00

Special Offer

Demonstration Program:

Small parts of three of the graphical adventures have been combined in this program to let you see the quality of these adventures. \$4.00

All adventures require
Extended Basic
Cassette Orders Only

Send Check or Money Order to:

Walter J. Dollard
417 Woodland Hills
Pittsburgh, PA 15235

EASYDATA

File Management System
Define, Create, Delete, Dump Files
Update, Select, Sort, Print records
Disk, X-Basic
8 Programs-\$29.95

★ ★ ★ ★ ★ ★

HOTSLOT

4 Wheel Slot with Music
Purse, Jackpots, Name Displayed
Basic-\$14.95

AYERS COMPUTER PRODUCTS

1619 Geyser Circle
Antioch, Ca. 94509
Tel-(415) 757-1124

10 DAY MONEY BACK GUARANTEE



EXTENDED automatic tone dialer & directory program*

only
\$19.95 POSTPAID

ALPHA 2
COMPUTER SERVICES
DEPT H
4859 SO. SPENCER
SEATTLE WA 98118

*requires extended basic

*ADVENTURE GAMES from
SHENANGO ENTERPRISES*

19401 Shenango Drive
Tarzana, CA 91356

1. AGENT 000:

Outwit the enemy agents, escape a black hole, search Atlantis, much more.

2. AGENT 000 RETURNS

Unravel a time paradox, unite the ghost and Agent 000, more.

One game Two games
\$16.95 \$24.95

Check or money order.

Versionst:

A. Xbasic, Cassette
 B. Xbasic, Disk
 C. Xbasic, Disk, 12k

Aardvark . . . from p. 24

1280-1290	Choose a random path for the anteater's tongue.
1300-1430	Control loop for moving the anteater's tongue through the hill.
1440-1790	Data to control the path of the anteater's tongue.
1800-2150	Subroutines to restore the data statements.
2160-2270	End of the game. Restart the game.
2280-2390	Subroutine to move the anteater's body and tail.

SMART PROGRAMMING GUIDE FOR SPRITES

595

This guide will show you some of our professional programming secrets on how to: Use CALL PEEK • Get Sprites to pick up objects, eat dots and lay down a trail. • Shoot sprites without missing a coincidence. • Make one sprite chase another. • Easily convert sprite rows and columns into graphic rows and columns and visa versa. • Generate moving sprite patterns. • Use 3 different CALL KEY or CALL JOYST examples for moving sprites. • Write a GENERAL BAR GRAPHING program (to one pixel accuracy) that shows you sprites aren't just for games.

Full of fast running and Byte saving examples that you can use in your existing programs or combine together to write your own programs. Each example program is fully documented in a step by step method that is easy to understand. A TI 99/4 or 99/4A computer and the extended basic command module are required.

Sorry, no C.O.D.'s or credit card orders. Foreign orders payable in U.S. currency. CA. residents add 6½% sales tax. Shipping and handling U.S., Canada and Mexico 1.50. All other countries 3.50.

15 day money back guarantee.



MILLERS GRAPHICS

1475 W. CYPRESS

SAN DIMAS, CA 91773

(714) 599-1431

Aardvark

```

1000 CALL HCHAR(FH,FV,120) :: CALL HCHAR(FH,FV-1,36) :: CALL SOUND(-100,6000,0,8000,0) :: RETURN
1050 CALL HCHAR(FH,FV,120) :: CALL HCHAR(FH+1,FV,36) :: CALL SOUND(-100,6000,0,8000,0) :: RETURN
1100 CALL HCHAR(FH,FV,120) :: CALL HCHAR(FH-1,FV,36) :: CALL SOUND(-100,6000,0,8000,0) :: RETURN
1150 CALL SOUND(100,2000,0) :: CALL SOUND(100,1000,0)
1200 LET DEUF=DEUF+1
1250 CALL HCHAR(2,DEUF,97)
1300 CALL HCHAR(FH,FV,36)
1350 IF DEUF=7 THEN 2160

```

```

1100 FH=22 :: FV=30 :: CALL HCHAR(FH,FV,120)
1140 TIM=0
1150 RETURN
1160 CALL GCHAR(AA+1,BB,XZ)
1170 IF XZ=120 THEN GOSUB 1190
1180 RETURN
1190 CALL SOUND(100,110,0) :: CALL SOUND(100,500,0)
1200 LET ANT=ANT+1
1210 CALL HCHAR(2,ANT,36)
1220 GOSUB 2280
1230 TIM=0
1240 IF ANT=30 THEN 2160
1250 FH=22 :: FV=30
1260 CALL HCHAR(FH,FV,120)
1270 RETURN
1280 RANDOMIZE :: TONG=INT(RND*9)+1

```

```

1290 ON TONG GOSUB 1800,1820,1840,1860,1880,1900,1920,1940,1960
1300 REM
1310 FOR I=1 TO 13
1320 READ AA,BB,CC
1330 GOSUB 1160
1340 CALL HCHAR(AA+1,BB,CC)
1350 NEXT I
1360 ON TONG GOSUB 1980,2000,2020,2040,2060,2080,2100,2120,2140
1370 CALL SOUND(1500,5,10)
1380 FOR I=1 TO 13
1390 READ AA,BB,CC
1400 CALL HCHAR(AA+1,BB,CC)
1410 NEXT I
1420 GOSUB 2340
1430 RETURN
1440 DATA 20,14,36,19,14,36,18,14,36,17,14,36,16,14,36,15,14,36,14,14,36,11,14,36
1450 DATA 12,14,36,11,14,36,10,14,36,9,14,36,8,14,36,0,0,0,0,0,0
1460 DATA 14,20,36,14,19,36,14,18,36,13,18,36,13,17,36,13,16,36,13,15,36
1470 DATA 13,14,36,12,14,36,11,14,36,10,14,36,9,14,36,8,14,36,0,0,0,0,0,0
1480 DATA 10,24,36,10,23,36,10,22,36,10,21,36,10,20,36,10,19,36
1490 DATA 10,18,36,10,17,36,10,16,36,10,15,36,10,14,36,9,14,36,8,14,36,0,0,0,0,0,0
1500 DATA 10,4,36,10,5,36,10,6,36,10,7,36,10,8,36,10,9,36,10,10,36
1510 DATA 10,11,36,10,12,36,10,13,36,10,14,36,9,14,36,8,14,36,0,0,0,0,0,0
1520 DATA 12,8,36,12,9,36,13,9,36,13,10,36,13,11,36,13,12,36,13,13,36,13,14,36
1530 DATA 12,14,36,11,14,36,10,14,36,9,14,36,8,14,36,0,0,0,0,0,0
1540 DATA 15,9,36,15,10,36,14,10,36,13,10,36,13,11,36,12,11,36,11,11,36
1550 DATA 10,11,36,10,12,36,10,13,36,10,14,36,9,14,36,8,14,36,0,0,0,0
1560 DATA 10,7,36,10,8,36,10,9,36,10,8,36,10,9,36,10,10,36
1570 DATA 10,10,36,10,11,36,10,12,36,10,13,36,10,14,36,9,14,36,8,14,36,0,0,0,0
1580 DATA 10,16,36,17,16,36,16,16,36,15,16,36,14,16,36,13,16,36
1590 DATA 10,15,36,10,14,36,12,14,36,11,14,36,10,14,36,9,14,36,8,14,36,0,0,0,0
1600 DATA 10,11,36,10,12,36,10,13,36,10,14,36,10,15,36,10,16,36,10,17,36
1610 DATA 10,14,36,10,15,36,10,16,36,10,17,36,10,18,36,10,19,36,10,19,36
1620 DATA 10,14,96,9,14,96,10,14,96,11,14,96,12,14,96,13,14,96
1630 DATA 14,14,96,15,14,96,16,14,96,17,14,96,18,14,96,19,14,96,20,14,96,21,14,96,0,0,0,0,0,0
1640 DATA 8,14,96,9,14,96,10,14,96,11,14,96,12,14,96,13,14,96,14,14,96,15,14,96,16,14,96,17,14,96,18,14,96,19,14,96,20,14,96,21,14,96,0,0,0,0,0,0
1650 DATA 10,20,99,10,21,99,10,22,99,10,23,99,10,24,99,0,0,0,0,0,0
1660 DATA 8,14,96,9,14,96,10,14,96,10,14,96,10,15,99,10,16,99,10,17,99,10,18,99,10,19,99
1670 DATA 10,20,99,10,21,99,10,22,99,10,23,99,10,24,99,0,0,0,0,0,0
1680 DATA 8,14,96,9,14,96,10,14,96,10,15,99,10,16,99,10,17,99,10,18,99,10,19,99,10,19,99
1690 DATA 10,9,99,10,8,99,10,7,99,10,6,99,10,5,99,10,4,99,0,0,0,0,0,0
1700 DATA 8,14,96,9,14,96,10,14,96,11,14,96,12,14,96,13,14,96,14,14,96,15,14,96,16,14,96,17,14,96,18,14,96,19,14,96,10,11,99,10,12,99,13,11,99,13,10,99

```

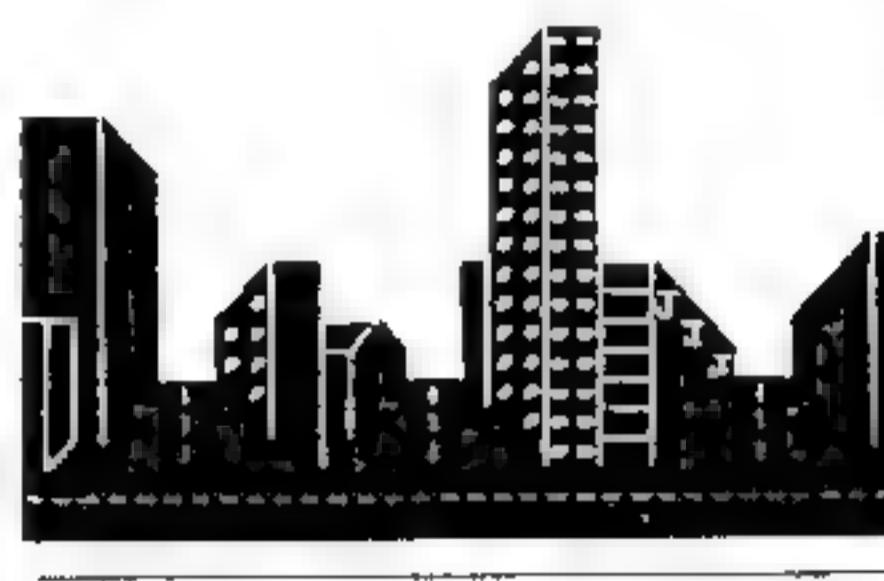
Continued on p. 36

ALPHA

SOFTWARE PRESENTS.

QUADRANT COMMAND

MEAN STREETS



JOHN C. WILLIAMS
BY:
JOHN D. GARDNER

YOU ARE IN COMMAND OF "ALPHA QUADRANT".....YOUR MISSION IS TO DEFEND YOUR BASE AGAINST ALIEN ATTACK. STOP THE DREADED VANIAN DEATH STARS BEFORE THEY DAMAGE YOUR BASE, DESTROY THE MOTHER SHIPS. HIGH RESOLUTION 3-D GRAPHICS, COLOR AND SOUND.

JOHN C. WILLIAMS
BY:
JOHN D. GARDNER

THE SEYLENSE LIBERATION ATTACK GROUP (SLAG), HAS JUST ROBBED THE LAST NATIONAL BANK ON THE NORTH SIDE OF TOWN. THEY ARE PEASING YOUR WAY. STOP THEM IF YOU CAN WITH YOUR 10 MEMBER SWAT TEAM. HIGH RESOLUTION 3-D GRAPHICS, COLOR AND SOUND.

BOTH PROGRAMS ARE IN T.I. EXTENDED BASIC ONLY



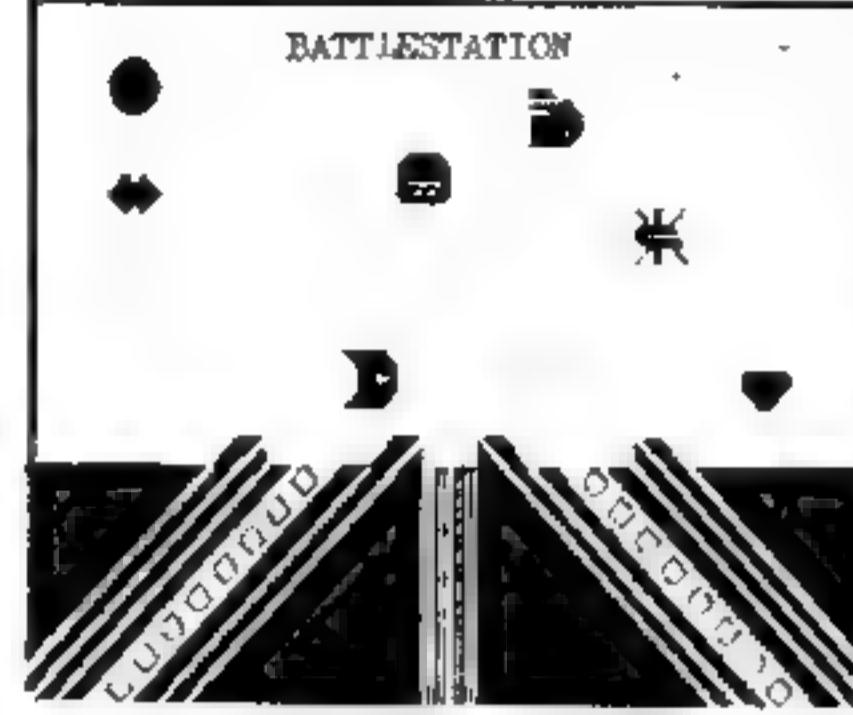
TO ORDER: PLEASE SEND \$17.95 FOR CASSETTE OR DISK TO
ALPHA SOFTWARE
P.O. BOX 461
WEST SENeca, NEW YORK 14224
ALL PROGRAMS ARE SHIPPED P.P.D.
NEW YORK RESIDENTS PLEASE ADD 7% SALES TAX
AREA CODE (716) 674-5511

MIRAGE

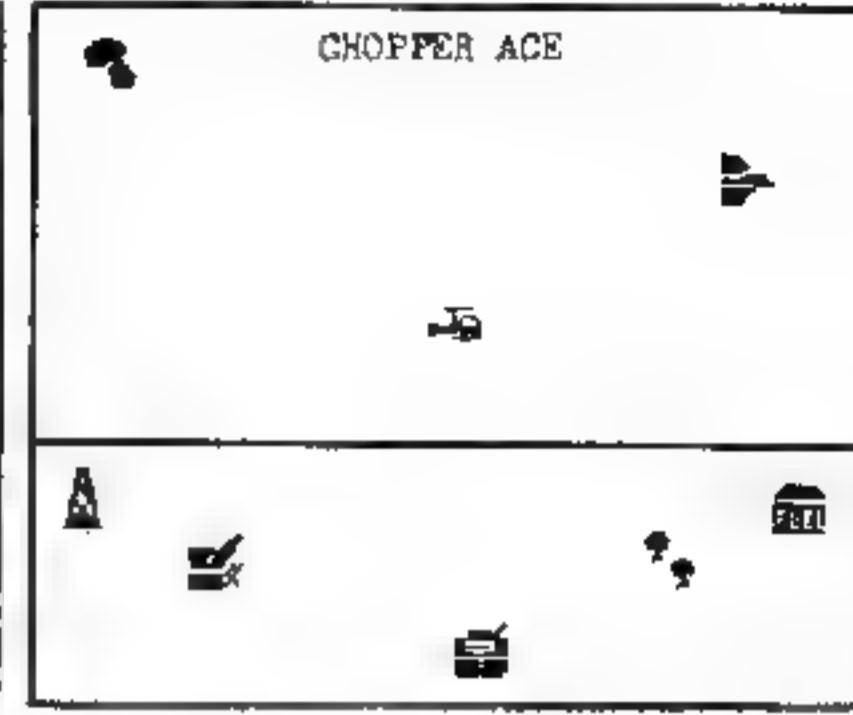
SOFTWARE

PRESENTS

BATTLESTATION



CHOPPER ACE



JOHN C. WILLIAMS & JOHN D. GARDNER THE AUTHORS OF "QUADRANT COMMAND" & "MEAN STREETS" BRING YOU TWO MORE FAST ACTION 3-D GAMES.

BATTLESTATION
YOU ARE ON PATROL IN DEEP SPACE..... WITHOUT WARNING YOU ARE ATTACKED. INFEAT WAVE AFTER WAVE OF INVADING ALIENS, BEFORE TIME RUNS OUT AND THEY DESTROY YOU. BATTLESTATION. ONE OR TWO PLAYER GAME. HIGH RESOLUTION 3-D GRAPHICS, COLOR AND SOUND. EXTENDED BASIC ONLY.

CHOPPER ACE
FOR THE "GULF" OIL IN THE MIDEAST COUNTRY OF "YATDOIYNOTOGO". SAVE YOUR DRILLING CREW FROM THE REVOLUTIONARY WHO ARE SWEEPING ACROSS THE DESERT TRYING TO OVERTHROW THE GOVERNMENT. HIGH RESOLUTION 3-D GRAPHICS, COLOR AND SOUND. EXTENDED BASIC ONLY.

TO ORDER

PLEASE SEND \$ 17.95 FOR CASSETTE OR DISK TO:
MIRAGE SOFTWARE
P.O. BOX 633
WEST SENECA, NEW YORK 14224
ALL PROGRAMS ARE POSTPAID BY MIRAGE
NEW YORK RESIDENTS PLEASE ADD 7% TAX
AREA CODE (716) 674-5511
SASE FOR FREE CATALOG

VIET NAM ERA HEROES

\$19.95 US FUNDS
CASSETTE OR DISK
NY RES ADD 7%

dataart

THE INFANTRYMAN, PILOT, DRIVER, NURSE ... EACH NEEDED DIFFERENT SKILLS. YOU WILL NEED ALL OF THEIR SKILLS PLUS SOME OF YOUR OWN TO BECOME A HERO IN THIS FOUR PART GraphicAdventure

EXTEND BASIC REQUIRED

ZEPPELINS vs. TANKS in N. AFRICA!

An "EXCITING" W.W.II. Air/Land Battle Game

TANKS



\$17.95
PPD

CASSETTE OR
DISK

THE ALLIES HAVE DECIDED THAT THE ONLY WAY TO STOP ROMMEL'S TANKS FROM OVERRUNNING NORTH AFRICA IS A HOT AIR BALLOON, LOADED WITH BOMBS. WATCH OUT FOR GERMAN GUN BATTERIES!!
EXTENDED BASIC REQUIRED

1874 UNION ROAD, WEST SENECA, NY 14224

Excerpts from the

99'ER DIGEST™

of news & happenings in
the Home Computer world

SCHEDULED 99/8 INTRO POSTPONED--4A CHANGES COLOR

The much-talked about 99.8 Home Computer will not be formally introduced at the June Consumer Electronics Show (CES) as anticipated. With market conditions changing so rapidly, it appears that TI prefers to delay a pricing decision until closer to actually being able to "stock the shelves" --likely in 4th quarter for the holiday buying season. This would signify a major departure from TI's traditional marketing policy of anchoring new product announcements to the January and June CES events. Industry analysts expect the 4A's "Big Brother" to carry a price tag somewhere in the \$200-\$500 range at the time of launch. Meanwhile Lubbock gears up for producing the 99/4A computer consoles and peripherals in a new gray color. TI's choice of lighter colors is said to be based on consumer color preference. The on-off switch gets moved from the right front edge to the lower right top surface, and cost reductions on the printed circuit board will be implemented.

NEW HEX-BUS PERIPHERALS USHER IN TI EXCLUSIVITY POLICY

Two new Hex-bus peripherals are to be CES announced for 4th quarter availability: The \$99.95 HX-3100 Telephone Modem is a 300-baud, direct connect, full-duplex device connecting directly to the CC-40 or to the 99.4A through the previously announced Hex bus Adapter. The HX-1100 Video Interface provides CC-40 users with a 40 character by 24 line screen display on TV or video monitor. TI states that "a patent is pending on the Hex-bus system . . . [and it] does not intend to license this patent to others for manufacturing or distributing peripherals for TI computers . . . TI will enforce this patent against unauthorized use by outside parties."

MBX VOICE RECOGNITION SYSTEM COMES HOME AT HIGHER PRICE

TI's formal June CES announcement of the Milton Bradley MBX Expansion System for the 99/4A (first shown at last January's CES) will "unbundle" the keypad unit from its multi-function joystick, so that the pair will carry a combined suggested retail price (SRP) of about \$160--over double the price as originally predicted by MB. Software cartridges for the MBX System are being priced at an SRP of \$49.95 for packages "enhanced by use of" the system, and \$59.95 for those that "require use of" the system.

NEW SOFTWARE FORMS BULK OF CES OFFERINGS

CES attendees are expected to see previews of 4 new arcade games, a word processor, and 6 educational packages for the Home Computer. M*A*S*H, Sneggit, and Moonmine are cartridge based; Entrapment, will be on cassette for loading with and RUNning from the Mini Memory cartridge. A TI-Mini Writer cassette, also for use with Mini Memory, will be announced for 3rd-quarter availability. With an SRP of \$19.95, the product provides word-processing capability at minimum cost. TI's educational packages illustrate an aggressive software acquisitions program--all six developed outside of TI. Early LOGO Learning Fun from the Lamplighter School is the first cartridge release of LOGO activity procedures. July availability expected. The remaining 5 packages for 4th quarter release include 3 E.T. based educational software games from Looking Glass Software, and 2 vocabulary grammar games from Development Learning Materials, Inc. All game and education cartridges carry a \$39.95 SRP.

99'er Digest is a marketing information service for retailers, distributors, hardware manufacturers, analysts and other TI-watchers interested in the home computer industry. It is a monthly publication and possible advertising revenue is the primary source of support. The content is derived from the best sources in the industry. It is not a magazine. For subscription details contact Emerald Valley Publishing Co., 1000 Valley View Drive, Lubbock, TX 79424.

99'er Digest is a trademark of Emerald Valley Publishing Co.

BeeJay FUNWARE

BLACKJACK - One or two players against the house. Follows all Vegas rules. Excellent graphics. Multiple decks. We know you will like this one!

BLACKJACK II(*) - Play blackjack with a friend - on the telephone! We are first with remote games for the 99/4A

CALENDAR - On what day of the week will your birthday fall in 2001? In 1,000,000? This program explains our gregorian calendar system and will draw a calendar for any month of any year, even BC! It highlights the holidays and you can add your own special dates - permanently! Another BJF original!

MINIGOLF - 18 holes of miniature golf for 1 or 2 players. 64 different greens. No 2 consecutive holes or games are the same. Challenging and fun!

MINIGOLF II(*) - Play golf with a friend - on the telephone! A fine use for your comm gear!

XORKLE - A six-dice game for up to 6 players. A unique challenge to your daring and judgment! Can you throw a triple? If you XORKLE you've blown your turn! A BeeJay Funware original.

XORKLE II(*) - Play XORKLE on 2 home computers over the phone! Up to three players at each location. (*) requires RS232 interface, modem & a fellow 99'er similarly equipped. Each player must have a copy of the program (order two). All programs require Extended Basic. Multiple programs furnished on same tape or disk.

***** Prices *****
1 PROGRAM...\$12.95 2 PROGRAMS...\$16.95
4 PROGRAMS \$21.95 PLEASE ADD \$1.50 SHIPPING
Colorado residents please add 6.5% sales tax.

BeeJay FUNWARE

P.O. Box 27643

Denver, CO 80227 303-979-6193
SATISFACTION GUARANTEED

USERS GROUP • QUALITY



WHY PAY MORE? JOIN OUR

MEMBERSHIP FEATURES:

- A CURRENT CATALOG OF 600 QUALITY PROGRAMS FROM OUR EVER EXPANDING OWNER WRITTEN AND TRANSLATED SOFTWARE LIBRARY OF OVER 1000 PROGRAMS. AND ONLY A \$2 SERVICE CHARGE PER PROGRAM ORDERED. PROGRAMS AVAILABLE ON CASSETTE OR DISK
- PROGRAMS FOR BASIC SYSTEMS (99/4A and recorder) AND EXPANDED SYSTEMS (EXTENDED BASIC, SPEECH, PRINTER, ETC)
- HIGHLY INFORMATIVE NEWSLETTERS CONTAINING HINTS, PROGRAM REVIEWS, PROBLEM SOLVERS AND MUCH MORE
- 5 FOR 1 PROGRAM EXCHANGE FOR THOSE MEMBERS WISHING TO SUBMIT A QUALIFYING PROGRAM FOR OUR LIBRARY

PROGRAMS ONLY 2.00 EACH

**SEND YOUR ONE-TIME
MEMBERSHIP FEE OF \$10 TO:**

THE 99/4A PROGRAM EXCHANGE

P.O. BOX 3242

TORRANCE, CA 90510

• VISA & MASTERCARD ACCEPTED •

Aardvark... from p. 33

```

1710 DATA 13, 9, 98, 12, 9, 100, 12, 8, 99,
  0, 0, 0, 0, 0, 0
1720 DATA 8, 14, 96, 9, 14, 96, 10, 14, 101
  , 10, 13, 99, 10, 12, 99, 10, 11, 102, 1
  , 11, 96
1730 DATA 12, 11, 96, 13, 11, 101, 13, 10,
  102, 14, 10, 96, 15, 10, 101, 15, 9, 99
  , 0, 0, 0, 0, 0
1740 DATA 8, 14, 96, 9, 14, 96, 10, 14, 101
  , 10, 13, 99, 10, 12, 99, 10, 11, 99, 10
  , 10, 99, 10, 9, 99, 10, 8, 102, 11, 8, 9
  6
1750 DATA 12, 8, 101, 12, 7, 102, 13, 7, 96
  , 0, 0, 0, 0, 0
1760 DATA 8, 14, 96, 9, 14, 96, 10, 14, 96,
  11, 14, 96, 12, 14, 96, 13, 14, 96, 14,
  14, 96, 15, 14, 101, 15, 13, 99, 15, 12
  , 99
1770 DATA 13, 16, 100, 14, 16, 96, 15, 16,
  96, 16, 16, 96, 17, 16, 96, 18, 16, 96
  , 0, 0, 0, 0, 0
1780 DATA 8, 14, 96, 9, 14, 96, 10, 14, 96,
  11, 14, 96, 12, 14, 96, 13, 14, 96, 14,
  14, 96, 15, 14, 101, 15, 13, 99, 15, 12
  , 99
1790 DATA 15, 11, 102, 16, 11, 96, 17, 11,
  96, 0, 0, 0, 0, 0, 0
1800 RESTORE 1620
1810 RETURN
1820 RESTORE 1640
1830 RETURN
1840 RESTORE 1660
1850 RETURN
1860 RESTORE 1680
1870 RETURN
1880 RESTORE 1700
1890 RETURN
1900 RESTORE 1720
1910 RETURN
1920 RESTORE 1740
1930 RETURN
1940 RESTORE 1760
1950 RETURN
1960 RESTORE 1780

```

```

1970 RETURN
1980 RESTORE 1440
1990 RETURN
2000 RESTORE 1460
2010 RETURN
2020 RESTORE 1480
2030 RETURN
2040 RESTORE 1500
2050 RETURN
2060 RESTORE 1520
2070 RETURN
2080 RESTORE 1540
2090 RETURN
2100 RESTORE 1560
2110 RETURN
2120 RESTORE 1580
2130 RETURN
2140 RESTORE 1600
2150 RETURN
2160 CALL CLEAR :: CALL DELSPRITE (#1) :: CALL DELSPRITE (#2)
2170 CALL CHAR(140, "7B0900C1F3F373F0
  F1E46AF532519029D8000000000000000
  0000000F0FCFEFF850CF")
2180 CALL SPRITE (#1, 128, 5, 49, 180, #2
  , 132, 5, 49, 207)
2190 CALL SPRITE (#3, 140, 14, 198, 180)
2200 CALL COLOR(8, 2, 1)
2210 DISPLAY AT(6, 5) : ANT~25. " ANTS
  FOURMIS
  "
2220 DISPLAY AT(15, 5) : DELF-2. " FOOD
  INOURRI
  TURE"
2230 DISPLAY AT(21, 1) : "TAPEZ UNE CL
  EF * PRESS A KEYFOUR ENCORE...
  * TO START
  AGAIN."
2240 CALL KEY(0, K, S) :: IF S=0 THEN
  2240
2250 CALL DELSPRITE (ALL)
2260 GOTO 180
2270 END
2280 FOR R=1 TO 10 :: CALL PATTERN(
  #1, 156) :: CALL PATTERN (#2, 140)

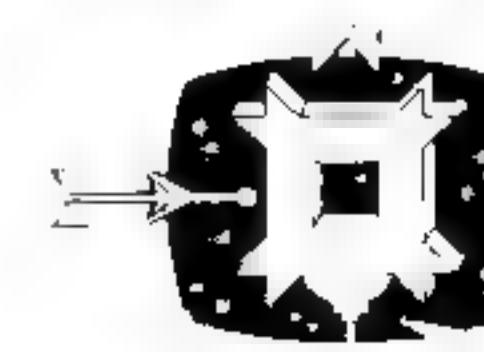
```

Zapper... from p. 31

```

3550 CALL SCREEN(7)
3560 CALL SCREEN(12)
3570 CALL SCREEN(3)
3580 CALL SCREEN(5)
3590 CALL SCREEN(2)
3600 CALL CLEAR
3610 PRINT "STATION SPACE ZAPPER HA
  S BEEN BROKEN DOWN INTO ITS
  SEPARATE MOLECULES...."
  :
3620 PRINT "YOU SUCCESSFULLY SHOT D
  OWN": N; "ENEMIES.": : E : : : :
  :
3630 FOR F=1 TO 1000
3640 NEXT F
3650 CALL CLEAR
3660 FOR F#2 TO 8
3670 CALL COLOR(F, 1, 1)
3680 NEXT F
3690 GOTO 850

```



Natural Language Technology Advances

From Texas Instruments Data Systems News

One of the computer industry's first natural language interfaces for desk-top work stations is being developed for TI's new Professional Computer. Common English words and phrases are used to ask questions of the data base or to give commands for specific tasks. "We think it sets a new standard for ease of use," explained Data Systems Group President Eric Jones.

The interfaces are supplied on disks and designed so that they can be customized to meet the particular needs of specific users. "Help" facilities are built into the capabilities at all levels to aid users who are unsure of the procedures.

Each TI natural language interface provides a user-friendly, menu-driven method of specifying an English language query or command in a highly structured manner. The video display screen is divided into several windows, with each window offering a choice of items to be selected. The system is structured to make available only those items that are logically compatible with previous selections. As each item is selected from the windows, a plain English sentence is constructed at the bottom of the screen, describing the function to be performed. By pressing just four keys, you can compose any possible question. Variables like quantity and part number are typed in one character at a time, when the display asks for them. Key words to be searched for, like company names and city names, are typed in conventionally.

The natural language interface to the Dow Jones Data Base, for example, allows a user to build an English-like sentence instructing the TI Professional Computer to display a particular company's stock quotes from the composite tape for the last ten trading days.

Previous natural language interfaces used with large mainframe computers have had the ability to query a data base with English-like sentences, but their ability to actually understand meanings was limited to certain sentences. Users of such interfaces, however, were not limited in what they could ask. Thus, a significant amount of time could be wasted before the system realized that a query had been entered that it was not designed to understand.

The TI natural language interfaces actually lead users through the sentence building process and, since the interfaces help to structure the sentence options, understanding is enhanced. By structuring the interfaces within certain grammatical confines, users should not have to face the situation of asking questions that cannot be answered.



A user responds to the natural language interface prompts on the Professional Computer code named *Pegasus*.

If a user is not exactly sure what question to ask, the interface prompts him or her through all the available steps to determine which questions are valid in view of the selections that have already been made. If a user sees that selections are not going to produce the desired results, he or she can "rub out" the necessary selections and backtrack. The interface then translates the natural English language selections from the English on the screen into the data language understood by the computer.

An advantage of these TI natural language interfaces is their ability to be

tailored to meet individual situations. For example, one interface could be created for use by company management, while another could be provided for use by those who have no need to access information of a sensitive nature.

Products based on the natural language capability are scheduled to be released later this year.

Reprinted with permission from Texas Instruments Data Systems News, Volume 1, Number 1, May 1983.

Copyright 1983 by Texas Instruments, Inc.

99'er

This column is an ongoing tutorial. Parts one and two appeared in the April and May, 1983, issues of 99'er HCM. To obtain full benefits from this column, a newcomer to *Multiplan* may find it useful to read the previously printed columns.

Microsoft's *Multiplan* is a great tool for manipulating numerical information. But numbers on the computer screen are not always enough to tell the whole story, so *Multiplan* also has features for handling text and printing. In fact, *Multiplan* has so many capabilities that it may seem like it can be used for almost anything.

I have found a few types of situations, however, which *Multiplan* does not handle well. These are not shortcomings of the program, because *Multiplan* was not designed to do everything. But these situations are so common that it is worthwhile to mention them. This little survey of its limitations will also give you an idea—by process of elimination—of what *Multiplan* is good for.

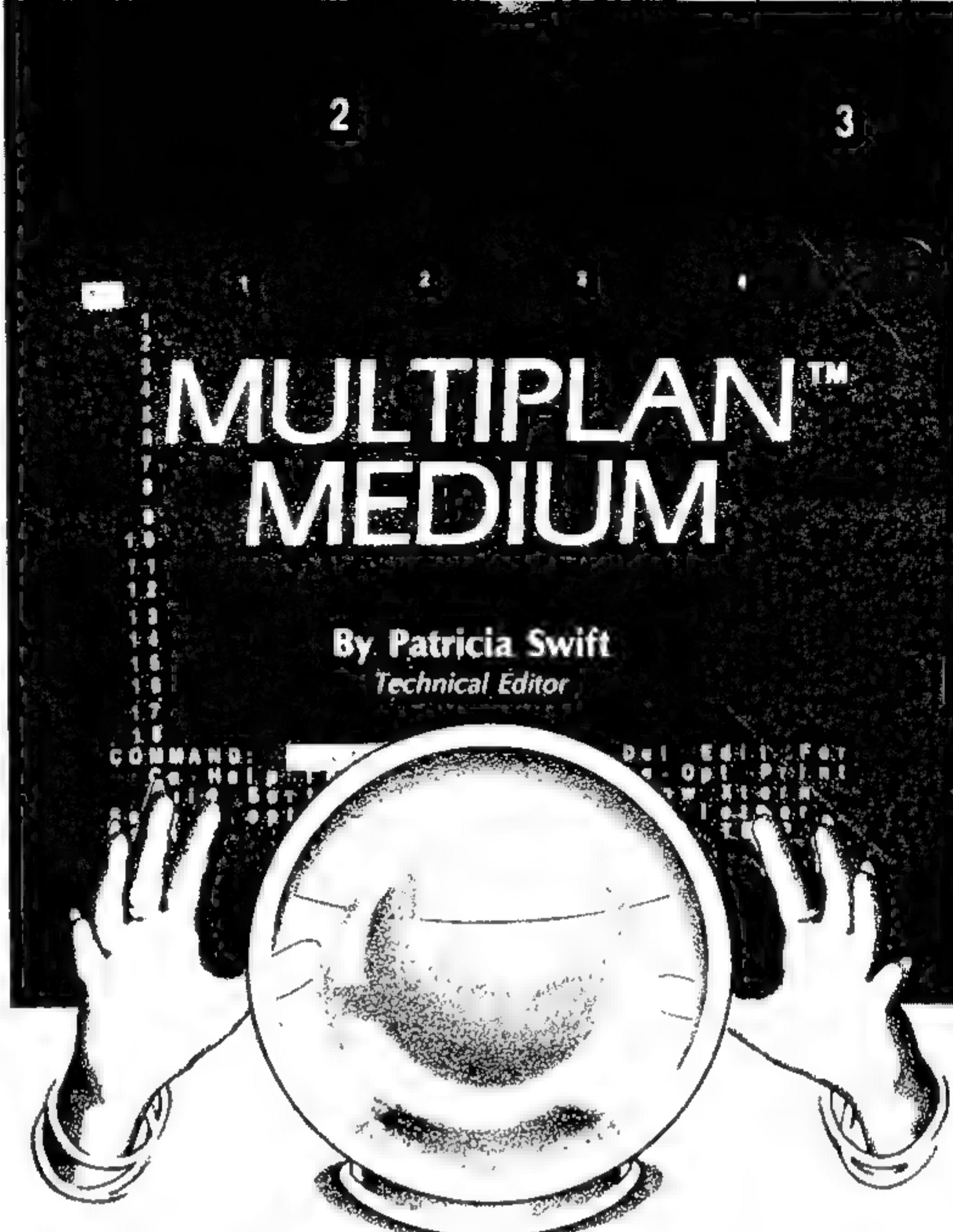
What *Multiplan* Can't Do

In spite of its text-editing features, *Multiplan* is not a word processor. If you want to prepare documents which consist mainly of words (text), you will be much better off using *TI-Writer* or another program designed specifically for text editing or word processing. This is not to say that *Multiplan* could not be used to create and edit these types of documents; it just wouldn't be very convenient for the user because of the row and column layout.

Nor does *Multiplan* shine in situations where quantities of information must be entered into the computer and then distributed selectively for processing. A good example of this is a common business task—keeping track of invoices and billing customers. *Multiplan* works well for entering the invoice information in as much detail as the user needs, but it is difficult (though not impossible) to get *Multiplan* to move these detailed invoices into each customer's account. There are programs which do this sort of thing well, including specialized accounting and more general programs called *data base managers*.

Multiplan is also limited in the amount of information it can hold. This can be overcome by linking worksheets together, but that is sometimes inconvenient.

It is interesting to note that I have not described anything that absolutely could not be done with *Multiplan*. It is more a question of how much time it takes to get *Multiplan* to produce the desired result. Once you learn to use the program and understand how it thinks, you will probably be able to devise a way to use *Multiplan* for everything you do.



Worksheets, Templates and Models

The worksheet is the medium of communication between you and *Multiplan*. A worksheet is just a rectangular arrangement of rows and columns of information. With *Multiplan*, instead of using pencil, paper and calculator, you fill in an electronic worksheet and let the program do the calculations. In setting up the electronic worksheet you are really describing the problem to *Multiplan*. Worksheets are also called "templates" or "models." These terms express another idea which is central to *Multiplan*: A worksheet is a mathematical representation of a certain situation and thus can be reused to evaluate similar situations. A purist might call it a worksheet while it is being developed and a template or model once it is finished, but I use the three terms interchangeably.

Multiplan places information in rectangular blocks of cells. A single cell, the smallest unit on the worksheet, is identified by its unique row and column number (or sometimes by name, as you will see later). A column on the worksheet can be thought of as a rectangular area of cells where the rectangle is just one cell wide. Similarly a row is a rectangle one cell high. Larger rectangular areas can also be easily referenced. It's helpful to keep this basic idea in mind when you design a worksheet.

The first step in designing a worksheet with *Multiplan* is to picture your problem in a row and column layout. If your problem is complex, you might want to sketch it roughly on paper first. Remember that you are limited to 256 rows and 63 columns. Then sit down with the 99/4A and *Multiplan*, and enter your idea onto a clean electronic worksheet.

You will probably want to use headings and descriptive text on the worksheet. It is easiest to enter these first, using the ALPHA command to give you a frame of reference. I often find that descriptions need to be longer than the eight characters you get by default. Widening the columns is a bad idea, however, because then you can see only a few columns on the screen at once. The perfect solution is to leave the columns eight characters wide while you set up the worksheet and then expand them later for printing and storage. (You can go as wide as 32 characters). *Multiplan* makes this easy to do by letting you type in the full description, but only displaying as many characters as will fit in the width currently set for that column. When you widen the column later, the longer description will appear.

The next task is to enter the numbers on the worksheet. Just as *Multiplan* has a default column width, it also has a built-in way of expressing numbers unless you say otherwise. This default

format is called the general format. *Multiplan* will show as many digits to the left of the decimal point as it takes to express the number exactly, or as will fit in the column. You can change this default format if you want. You should set the default format to correspond to the most common type of number you will use. For example, if most of the numbers on your worksheet will be dollars and cents, then you should change the default format to always show two decimal places. *Multiplan* also allows you to change the formats of specific cells, so you can have exceptions to the default format.

After you enter the known numbers, you are ready to have *Multiplan* calculate the unknowns. *Multiplan* has many functions for this and they will be covered in detail in future articles. The calculations can be simple or quite complex.

Meaningful Interaction

As you build the worksheet, you will probably want to change its layout as you go along. *Multiplan* is a highly *interactive* program. This means that it expects to have a give-and-take relationship with its user. *Multiplan* also strives to be convenient for you to use. That is why it uses defaults: It makes assumptions about the situation, and you need to specify only when things are different. In addition to anticipating your wishes with the defaults for column width and format, *Multiplan* also pays attention to the position of the cell pointer. For example, suppose you decide that you need to insert a row of information between rows 2 and 3 on your worksheet. If you choose the **INSERT** command, you will be given a chance to specify how many rows to insert and where they should be inserted. If you position the cell pointer on row 3 before choosing the **INSERT** command, *Multiplan* will automatically note that the new row will be inserted before row 3. *Multiplan* also remembers how many rows you inserted. The next time you invoke the **INSERT** command in the same session, the program will suggest that you insert the same number of rows as last time. Of course, you always have a chance to override these suggestions.

You will notice that as you get more information on a worksheet, it takes longer for *Multiplan* to accept the next input from you. This is because of its *re-calc* facility. Each time you fill in a cell, *Multiplan* looks at the other cells to see if their contents should be changed to reflect the information you just entered. This can really slow you down when you are designing a worksheet. But don't worry—you can turn off the *re-calc* while you enter and polish your worksheet, and then turn it on again when you want *Multiplan* to perform calculations. The **OPTIONS** command lets you do this.

If you get stuck on your worksheet, *Multiplan* is always ready to help. You can choose the **HELP** command for a comprehensive selection of topics. As options under **HELP**, you can choose Applications, Commands, Editing, Formulas, or Keyboard to see explanations of those subjects. You can also page backward and forward through this help file if you are really lost. And *Multiplan* provides the information in plain English. You can also get help by entering a question mark at any time, except in the middle of a text string (the **ALPHA** command). When you use the question mark after you have selected a command or option, *Multiplan* shows you the portion of its help file which deals with the command or option you have chosen.

Before you consider a worksheet finished, be sure to test it. After all, you might have made a mistake in a formula for a calculation. You can check it by using very simple numbers on the first worksheet, or by verifying the results with a calculator.

Saving the Results

If you have a printer, you'll probably want to **PRINT** the finished worksheet. You can specify to print only certain portions of the worksheet, and you can instruct *Multiplan* to print the

worksheet on several pages if it will not fit on one page. I often have worksheets which are between 81 and 132 columns wide. With my printer in compressed mode, I can fit these on a single page. Unfortunately, I know of no way to put my printer in compressed mode with *Multiplan*; so I use a BASIC program to select compressed print before I go into *Multiplan*. (If you decide to do this when you are in the middle of a worksheet, be sure to use the **SAVE** option to preserve what you've entered before you go to BASIC.) You must also specify the printer setup string for your particular printer; just use the string you normally use in the **OPEN** statement for BASIC. You can cancel the printed output in the middle of printing by using the **CANCEL** key (CTRL =); this is handy if the output looks wrong.

If you have a word processor such as *Ti-Writer*, you can "print" the worksheet to a disk file for editing on your word processor. You get to specify the name of the disk file to use. In this way, you can incorporate the worksheet created by *Multiplan* into a longer document.

You will also want to save the finished worksheet to disk via the **Save** option of the **TRANSFER** command. If the worksheet name is still the default TEMP, you should use the **Rename** option to save the worksheet under a more meaningful name. I usually save my worksheet after I have printed it, because that way the printer setup commands are also saved, but it never hurts to save the worksheet earlier as well.

Although *Multiplan* allows you to have file names with lower case letters, it is best to limit yourself to upper case letters (and numbers) in the file names you choose. TI's *Disk Manager* has problems with lower case letters, and so may other packages.

Multiplan itself has no graphics capabilities. However, it does allow you to **TRANSFER** the information from the worksheet to a disk file in *symbolic* format. This symbolic file can then be read by programs written in other languages. I have not tried this yet, but it probably means that you can do such things as graph *Multiplan* results using BASIC and Assembly Language programs of your own.

Using a Template

Once your worksheet is finished and stored on disk, the real power of *Multiplan*—its ability to evaluate similar situations containing different information—can be unleashed. The next time you have a similar situation to analyze, you can recall the template and fill in some new information. For some models, this will mean entering this month's figures; for others, it will just be a matter of changing a number or two. The point is that your relationships are all set up, so all you have to do is change the "givens."

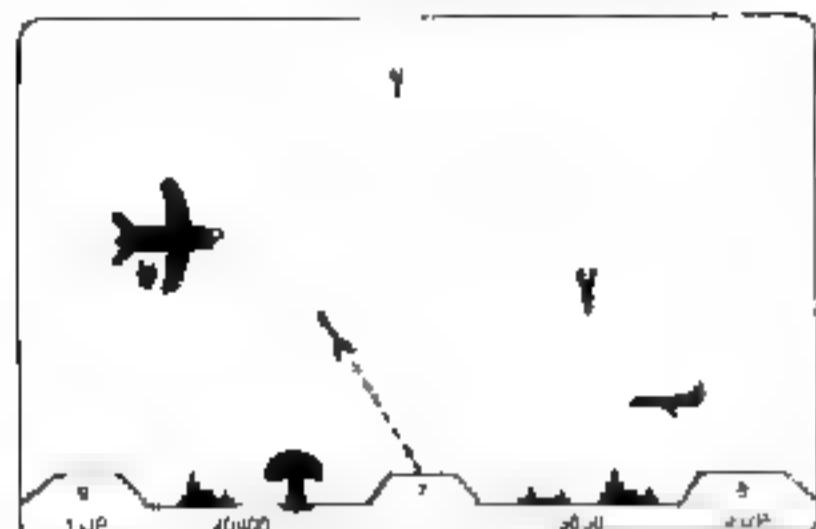
Think of the budget example in the last issue. You can use this model (or a variation of it) each month to track your expenses after the fact. But you could also use it when considering a major expenditure. You could add the hypothetical expense to the appropriate category and see what this would leave you to spend for each month left in the year. Or you could change the inflation rate, and immediately see how you will be affected.

The nice thing about using these electronic models (in addition to the time you save) is that you can experiment without fear of losing your original model. You can have *Multiplan* **LOAD** in the original model, and then manipulate it all you want. If you mess things up, you can always **QUIT** *Multiplan* without **SAVEing** the new model on disk. If your experiments on the model are successful, you can **SAVE** the new version on disk with a different name and still preserve the original as well. These basic principles apply to *Multiplan* as a whole. Understanding them will make it easier to follow the *Multiplan* discussions in the articles to come.



FANTASIA '99

A.B.M. CONTROL



A fast action, 1 or 2 player game. Defend 4 cities with 3 anti ballistic missile bases against an attack of I.C.B.M.'s, bombers, and cruise missiles.

Requires joysticks and Extended Basic.

\$11.95 U.S. or \$14.95 Can.

CASTLE NOVA

Guide Casanova through the mazes of the castle to the girl of his dreams. Invisible maze option, 5 difficulty levels.

TI Basic

\$7.95 U.S. or \$9.95 Can.

Available on disk or cassette
Ontario residents add 7% sales tax

Send check or money order to:

Fantasia '99 Software
3 Victor Blvd.

St. Catharines, Ontario, Canada, L2T 2B2

DRAC MAN



You, the "Count", must evade the ghosts in the maze. Reach the vials of blood and become energized. Then you are the pursuer.

Requires Extended Basic.
\$11.95 U.S. or \$14.95 Can.

ARITHMETEX

An educational game for youngsters drilling them on arithmetic. Up to 5 players compete. Thermometer shaped bar graphs and digital score readouts. Very user friendly.

\$11.95 U.S. or \$14.95 Can.

Available on disk or cassette
Ontario residents add 7% sales tax

Send check or money order to:

Fantasia '99 Software
3 Victor Blvd.

St. Catharines, Ontario, Canada, L2T 2B2

TI-99/4



TI-99/4A

DIRECT WRITER II

The "Customer Designed" Word Processor with

MORE FEATURES PER DOLLAR THAN ANY OTHER!!!!

Mix text sizes within a line on many dot matrix printers. 32 to 132 characters/line. "LIVE" editing. Faster Cursor. UNDERLINING. Displayed, storable tabulation markers. Auto-centering. Right Justify. Left Margin. And with Galtex Plus: Superscript Subscript Italics Double Strike.

Plus much, much more!

Also excellent for use with "daisy-wheel" printers.

Requires Ex. BASIC, Mem. Expansion, Disk drive (1 minimum) Complete with 60 page instruction manual \$66

DIRECT WRITER Original version \$48

Quimbee The Exciting Dice Game \$20

The Scheduler CPM Project Method \$38

Energy Conservation — Residential Heating \$28
Cost study program to SAVE you DOLLARS

Learning Morse Code & Programmable Morse Code Practice \$22
Two programs for easy, effective code study

For Purchases Mail Check Or Money Order To:

Dynamic Data & Devices

P.O. Box 912

Stafford, Texas 77477

(713) 343-0033

Add \$2.00 for postage and handling

SEND FOR FREE CATALOG OR INQUIRE AT YOUR LOCAL DEALER

TI 99-4A USER'S GROUP

IMAGINE!! 5 USER PROGRAMS FOR ONLY \$15.00

PURPOSE: To make available to owners of Texas Instruments Home Computers, a greater variety of software designed or translated by members at very low prices, a greater variety of hardware and software products manufactured by third parties and Texas Instruments at discount prices

BENEFITS: The Membership provides

- 1 User Software Catalog
- 2 Discount Prices on ALL Texas Instruments Products
- 3 Discounted Prices on Third Party Products that are compatible with the TI 99/4 and TI 99/4A.
- 4 New Product Announcements
- 5 Special Sale Promotions
- 6 Quarterly Newsletter

HOW THE USER PROGRAM WORKS:

1. If you submit an original or translated program, you may choose any (5) User Programs from our current User Group Catalog in exchange for each original or translated program you submit. Your program will be returned to you on your choice of either Diskette or Cassette

2 You say you're not a programmer! That's OK, you may purchase User Programs from our User Program Catalog for only \$3.00 per program; however, there is a minimum requirement of (5) programs per order. This is to cover our cost of media, duplicating, shipping, cassettes, diskettes, and mailings

Check one:
 6 Months \$12
 12 Months \$22
AMOUNT ENCLOSED \$
 CHECK
 MONEY ORDER

SORRY—NO C.O.D.'s
 AMERICAN EXPRESS
 Card No _____
 Expiration Date _____
^{5%} WILL BE ADDED FOR USE OF
 CREDIT CARD SERVICE

MEMBERSHIPS FOR 12 Months may choose an additional (2) User Programs FREE at anytime during the 12 Months

LUV-TR[♥]NICS USER GROUP

1111 Park Ave., Suite 303
 Baltimore, Maryland 21201
 (301) 523-5820



\$32.95

The New Disk Minder

- Attractive, functional disk storage
- 75 disk storage capacity
- Easy filing and retrieving
- Index dividers provided
- Easy carrying handle in front of box

ORDER TOLL FREE 800-227-8292

In Cal 415-969-6600 Use VISA or MasterCard.
 Please include \$1.95 for shipping and handling.

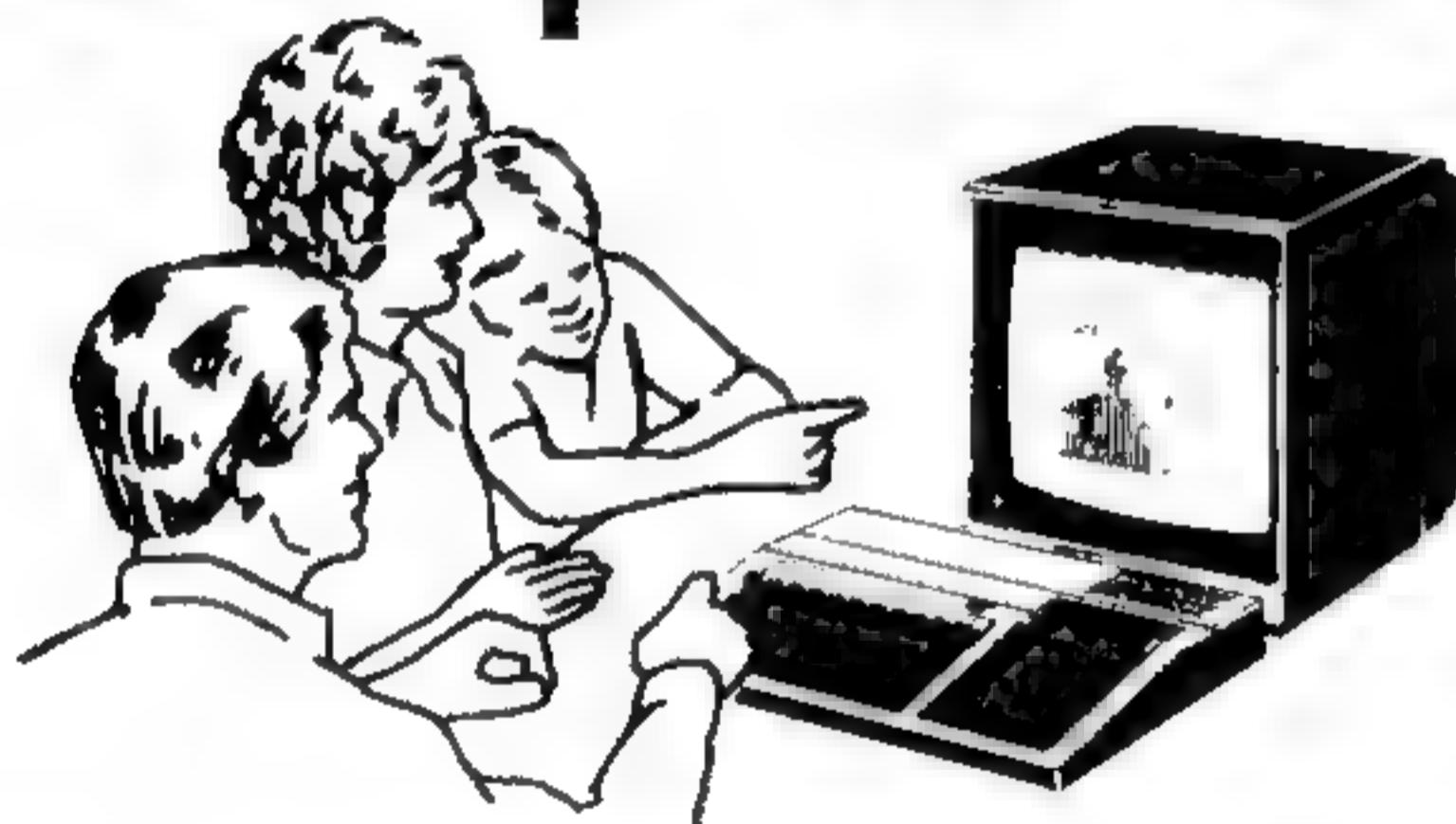
THE BACH COMPANY

P.O. BOX 51178, PALO ALTO, CALIFORNIA 94303

99'er BUYERS GUIDE™

A Bound-In Supplement for Subscribers
of 99'er Home Computer Magazine

Computer Dealers Wanted



For the Most Wanted Home
and Small Business
Computers
Texas Instruments 99/4A
Computers from Keystone
Distributing Company

Dealing with Keystone is like Dealing Direct!*

Keystone Distributing, one of the largest distributors of Texas Instruments products has a complete inventory of TI computers, software, peripherals, calculators, and educational products ready for shipment immediately!

Texas Instruments 99/4A computer gives an unmatched combination of features including more languages than any other computer on the market in its price category. If you are now paying more for other computers, software, peripherals, calculators, and educational products, but are making less—go for the best! Texas Instruments computer products distributed by Keystone Distributing Company of Norwood, Mass.

"GO FOR IT!" Call or Write:

KEYSTONE DISTRIBUTING

51 Morgan Drive

Norwood, Massachusetts 02062

Call: 1-617-769-3225 or outside Massachusetts 800-343-9030

*We sell wholesale only to qualified dealers.

F.O.B. Norwood, Mass. Please have your tax number ready when calling.



TEXAS INSTRUMENTS
INCORPORATED

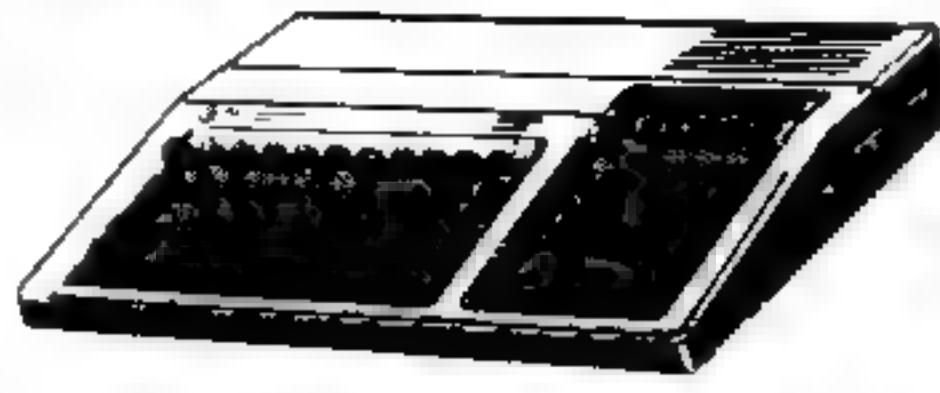
HUGE ELEK-TEK DISCOUNTS

TI-99/4A COMPUTER KEYBOARD

by TEXAS
INSTRUMENTS

TI-99/4A Keyboard 149.00
Less Mfr. Rebate 50.00

Price After Rebate 99.00
Limited Time Offer



EXTRA BONUS SAVE \$180

FREE PHP1200 PERIPHERAL EXPANSION BOX
with purchase of any 3 following items:

PHP 1200, PHP 1200B, PHP 1200C
PHP 1200, PHP 1200B, PHP 1200C
PHP 1200, PHP 1200B, PHP 1200C
PHP 1200, PHP 1200B, PHP 1200C

LIMITED TIME OFFER

Model	Name	Mfr. Sugg. Ret.	Elek- Tek Price	Model	Name	Mfr. Sugg. Ret.	Elek- Tek Price	Model	Name	Mfr. Sugg. Ret.	Elek- Tek Price
CONSOLE	TI-99/4A Home Computer (incl. RF Modulator,	225.00	149.00		Addison-Wesley Computer Math Games (Developed by Addison-Wesley Publishing Co.)	39.95	32.00		Adventure International Adventure Series (Developed by Scott Adams)	29.95	24.00
PERIPHERALS	Peripheral Expansion Box	249.95	180.00	PHM 3083 Computer Math Games II	39.95	32.00	PHM 5048 Adventureland	29.95	24.00		
PHP 1200	RS 232 Card	174.95	130.00	PHM 3088 Computer Math Games VI	39.95	32.00	PHM 5047 Mission Impossible	29.95	24.00		
PHP 1220	Disk Controller Card (One Disk Manager module packed with each Disk Controller)	249.95	180.00	Millennium Math Series—K thru 8th grade (Developed by Millennium Publishing Co.)	39.95	32.00	PHM 5048 VooDoo Castle	29.95	24.00		
PHP 1240	Expansion System Disk Drive (Disk Drive Controller required)	399.95	285.00	PHM 3090 Addition	39.95	32.00	PHM 5049 The Count	29.95	24.00		
WAB 11	Blank Disks			PHM 3091 Subtraction	39.95	32.00	PHM 5050 Strange Odyssey	29.95	24.00		
PHP 1260	Memory Expansion Card (32K RAM)	299.95	215.00	PHM 3092 Multiplication	39.95	32.00	PHM 5051 Mystery Fun House	29.95	24.00		
PHP 1270	P-Code Card (32K RAM Memory Expansion required)	249.95	180.00	PHM 3093 Division	39.95	32.00	PHM 5052 Pyramid of Doom	29.95	24.00		
PHP 1500	Solid State Speech Synthesizer	149.95	110.00	PHM 3095 Integers	39.95	32.00	PHM 5053 Ghost Town	29.95	24.00		
PHP 1800	Acoustic Coupler Modem	224.95	163.00	PHM 3096 Fractions	39.95	32.00	PHM 5054 Savage Island I & II	39.95	32.00		
PHP 1850	Disk Memory Drive (External)	499.95	350.00	PHM 3097 Decimals	39.95	32.00	PHM 5056 Golden Voyage	29.95	24.00		
PHP 2500	T 80 Column Impact Printer	750.00	500.00	PHM 3098 Percent	39.95	32.00					
PHP 2700	Program Recorder (Includes PHA 2622)	69.95	52.00	PHM 3099 Number Readiness	39.95	32.00					
PHP 4100	10" Color Monitor	399.95	320.00	PHM 3100 Laws of Arithmetic	39.95	32.00					
OPTIONAL ACCESSORIES				PHM 3101 Equations	39.95	32.00					
PHP 1100	Wired Remote Controllers (Pair)	34.95	28.00	PHM 3102 Measurement Formulas	39.95	32.00					
PHP 1950	Therma Paper (2 Pack)	9.95	8.00	Diskette							
PHP 2000	Cassette Cable	14.95	12.00	Texas Instruments Packages							
PHP 2010	Monitor Cable	19.95	15.00	PHM 5007 Teach Yourself BASIC	34.95	28.00	PHT 6010 Mystery Melody	9.95	8.00		
PHP 2700	Cassette Recorder	65.00	52.00	PHM 5008 Music Sheets Trainer	29.95	24.00	PHT 6015 Oldies But Goodies—Games I	14.95	12.00		
APPLICATION PROGRAMS				PHM 5009 Computer Music Box	19.95	16.00	PHT 6017 Oldies But Goodies—Games II	19.95	16.00		
Home Management/Personal Finance				PHM 5010 Market Simulation	19.95	16.00	PHT 8025 Saturday Night Bingo (Solid State Speech™ Synthesizer is required)	24.95	20.00		
Console Games				PHM 5019			PHT 8037 Draw Poker	19.95	16.00		
PHM 3006	Home Financial Decisions	29.95	24.00	PHM 5020 Teach Yourself Extended BASIC (Extended BASIC Command Module is required)	24.95	20.00	Adventure International Adventure Series (Developed by Scott Adams)	29.95	24.00		
PHM 3007	Household Budget Management (Data storage system is required)	39.95	32.00	PHM 5023 Basketball Statistics (Extended BASIC Command Module is required)	14.95	12.00	PHT 8045 Adventureland	29.95	24.00		
PHM 3012	Security Analysis	54.95	32.00	PHM 5026 Bridge Building I	24.95	20.00	PHT 8047 Mission Impossible	29.95	24.00		
PHM 3013	Persona, Record Keeping (Data storage system is recommended)	49.95	40.00	PHM 5027 Speak & Spell™ Program (Solid State Speech™ Synthesizer is required)	29.95	24.00	PHT 8048 Voodoo Castle	29.95	24.00		
PHM 3016	Tax/Investment Record Keeping (Disk system is recommended)	69.95	56.00	PHM 5028 Speak & Math™ Program (Solid State Speech™ Synthesizer and Terminal Emulator II are required)	29.95	24.00	PHT 8050 Strange Odyssey	29.95	24.00		
PHM 3022	Personal Real Estate (Data storage system is recommended)	69.95	56.00	PHM 5031 Speak & Math™ Program (Solid State Speech™ Synthesizer and Terminal Emulator II are required)	29.95	24.00	PHT 8052 Mystery Fun House	29.95	24.00		
PHM 3044	Personal Report Generator (Data storage system is recommended)	69.95	56.00	PHM 5036 Bridge Building II	24.95	20.00	PHT 8053 Ghost Town	29.95	24.00		
PHM 3111	T 80 Writer (32K Memory Expansion required)	94.95	76.00	PHM 5037 Beginner's BASIC/Tutor	29.95	24.00	PHT 8054 Savage Island I & II	39.95	32.00		
PHM 3112	Microsoft Multipan™ 4 (32K Memory Expansion required)	99.95	75.00	PHM 5085 Education/Personal Enrichment Continued			PHT 8056 Golden Voyage	29.95	24.00		
Diskette				PHM 5086 Science Facts (Extended BASIC Command Module is required)							
PHD 5001	Mailing List	68.95	56.00	PHM 5087 Natural Science (Extended BASIC Command Module is required)							
PHD 5003	Personal Financial Aids	19.95	16.00	PHM 5088 Social Science (Extended BASIC Command Module is required)							
PHD 5021	Checkbook Manager	19.95	16.00	PHM 5089 Teacher's Tool Box (Extended BASIC Command Module and printer are required)							
PHD 5022	Business Aids Library—Finance Management (Extended BASIC Command Module is required)	39.95	32.00	PHM 5090 Teacher's BASIC (Extended BASIC Command Module and printer are required)							
PHD 5024	Business Aids Library—Inventory Management (Extended BASIC Command Module is required)	39.95	32.00	PHM 5091 Music Sheets Trainer							
PHD 5027	Business Aids Library—Personnel Record Keeping or Statistics Command Module required)	89.95	56.00	PHM 5092 Computer Music Box							
PHD 6024	Business Aids Library—Invoicing Management (Personnel Record Keeping or Statistics Command Module required)	89.95	56.00	PHM 5093 Market Simulation							
PHD 6029	Business Aids Library—Cash Management (Extended BASIC Command Module is required)	39.95	32.00	PHM 6019 Teach Yourself Extended BASIC (Extended BASIC Command Module is required)							
PHD 6038	Business Aids Library—Lease/Purchase Decisions	69.95	56.00	PHM 6026 Bridge Building III							
Cassette				PHM 6031 Spell Writer (Terminal Emulator II Command Module and Solid State Speech™ Synthesizer are required)							
PHD 6003	Personal Financial Aids	14.95	12.00	PHM 6032 Beginner's BASIC/Tutor							
PHD 6038	Business Aids Library—Lease/Purchase Decisions	59.95	45.00	PHM 6039 Bridge Building II							
Documentation Section for Young Minds				PHM 6041 Bridge Building III							
PHA 2806	Creative Programming Computer Competency Series—Volume 1	9.95	8.00	PHM 6042 Spell Writer (Terminal Emulator II Command Module and Solid State Speech™ Synthesizer are required)							
PHA 2807	Creative Programming Computer Competency Series—Volume II	9.95	8.00	PHM 6057 Beginner's BASIC/Tutor							
PHA 2808	Creative Programming Computer Competency Series—Volume III	9.95	8.00	Entertainment							
PHA 2809	Creative Programming Computer Competency Series—Volume IV	9.95	8.00	Command Modules							
Educational/Personal Enrichment				Texas Instruments Packages							
Command Modules				PHM 3009 Football	29.95	24.00					
DLM Academics				PHM 3016 Video Games I	29.95	24.00					
PHM 3114	Antigone Mix	39.95	22.00	PHM 3023 Hunt the Wumpus	24.95	20.00					
PHM 3116	Demotion Division	39.95	32.00	PHM 3024 Indoor Soccer	24.95	20.00					
PHM 3118	Minute Mission	39.95	32.00	PHM 3025 Mind Challengers	24.95	20.00					
Texas Instruments Packages				PHM 3052 Tombstone City 21st Century	29.95	24.00					
PHM 3002	Early Learning Fun	29.95	24.00	PHM 3053 TI Invaders	29.95	24.00					
PHM 3003	Beginning Grammar	29.95	24.00	PHM 3054 Car Wars	29.95	24.00					
PHM 3004	Number Magic	19.95	16.00	PHM 3055 Munch Men	29.95	24.00					
PHM 3005	Video Graphs	19.95	16.00	PHM 3056 Tunnels of Doom (2 Diskette Games Included)	59.95	45.00					
PHM 3010	Video Chess	89.95	72.00	PHM 3057 Hustle II	29.95	24.00					
PHM 3020	Physical Fitness	29.95	22.00	PHM 3058 ZeroZap II	19.95	16.00					
PHM 3022	Music Maker (Data storage system is recommended)	59.95	32.00	PHM 3059 Hangman II	19.95	16.00					
PHM 3026	Weight Control and Nutrition (Data storage system is recommended)	59.95	32.00	PHM 3060 Connect Four II	19.95	16.00					
PHM 3040	TI LOGO (Memory Expansion required)	129.95	75.00	PHM 3061 Yahtzee II	24.95	20.00					
PHM 3064	Touch Typing Tutor (Available for TI-99/4A only)	39.95	32.00	PHM 3062 TI Invaders	24.95	20.00					
PHM 3109	TI Logo II (32K Memory Expansion required)	12									



AN EXPLOSION IN 3RD PARTY SOFTWARE

HOW DO YOU DECIDE WHAT'S REALLY BEST FOR YOU?

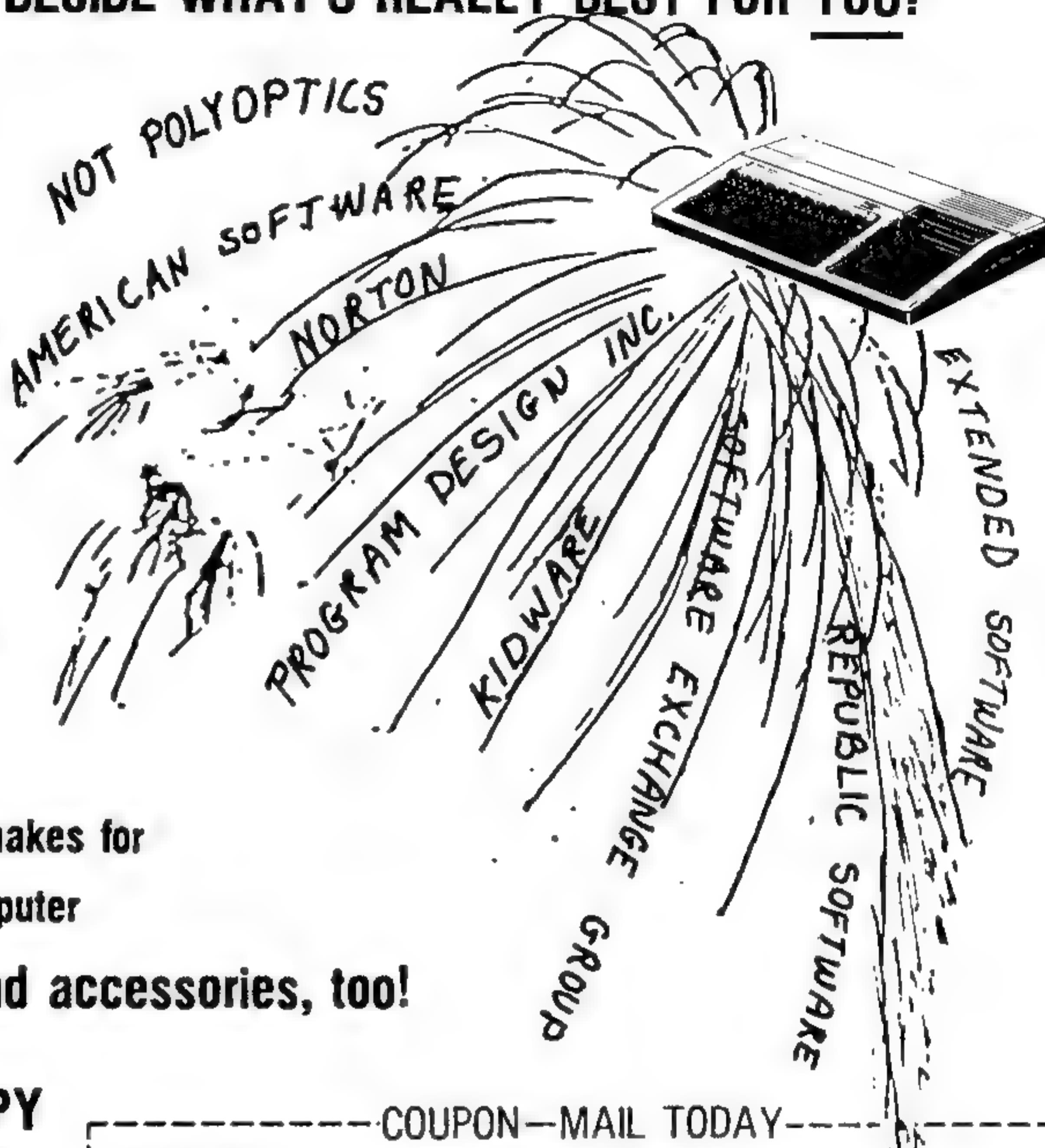
LET US HELP

We carry the best of the Third Party Software. And each program is fully described in our Computer Bulletin.

It's one-stop shopping for the best in 3rd Party Software at DHEIN'S.

We carry everything TI makes for the TI-99/4A Home Computer

NOW — Books and accessories, too!



**SEND FOR YOUR COPY
OF THE COMPUTER
BULLETIN TODAY!**

- Programs you can type in yourself
- Feature articles on the 99/4world
- Descriptive price list

COUPON-MAIL TODAY

FREE

Subscription to the COMPUTER BULLETIN

Name _____

Street _____ State _____

City _____ Zip _____

No extra charge for VISA or Master Card.

**The best combination of Price, Service and Quality is TRUE VALUE.
More than just a name, it is our way of doing business.**

DHEIN'S



(319) 236-3861

7 W. Airline Hwy.
Waterloo, IA 50701



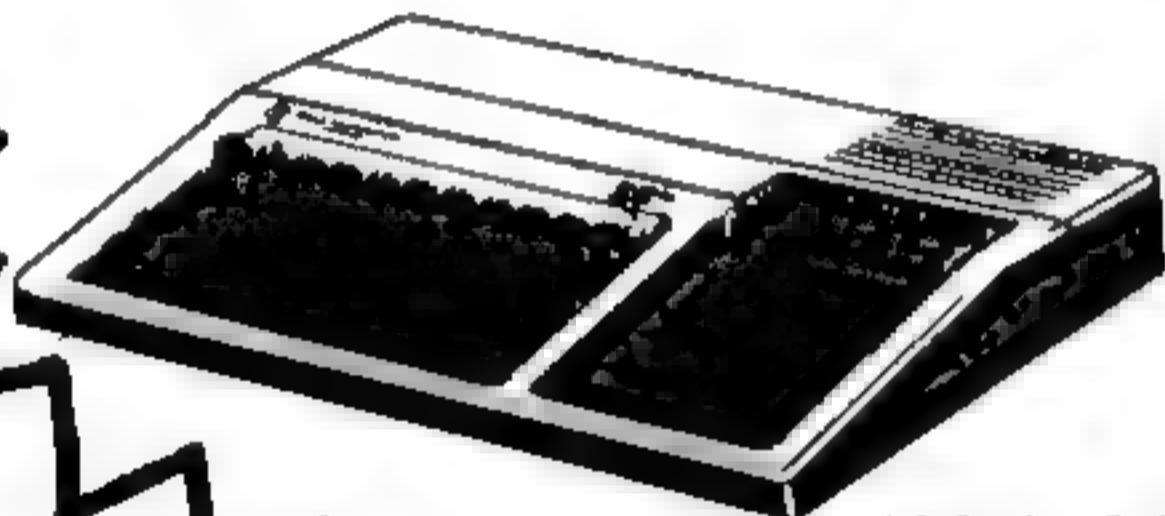


**MICRO
CANADIAN
WORKS**

**SUPER
SUMMER
SPECIAL**

**Texas Instruments
Home Computer**

**TI 99/4A CONSOLE plus
TI PROGRAM RECORDER**



\$299

CANADIAN FUNDS

NO SALES TAX

WRITE FOR OUR
PRICE LIST
OF ALL
**TEXAS
INSTRUMENTS**
HOME COMPUTER
PRODUCTS

PACKAGE
Consists of

PHC 004A CONSOLE
PHP 2700 CASSETTE RECORDER
PHA 2100 R F MODULATOR
PHA 2622 CASSETTE CABLE
PHA 2602 BASIC MANUAL
PHA 2603 REFERENCE GUIDE
PHT 6007 TEACH BASIC CASSETTE

delivery: June 1

BY FIRST CLASS MAIL

Cassette Recorder Direct from TI



CANADIAN WORKS
BOX 6221, STATION C, EDMONTON
ALBERTA T5B 4K6

PAYMENT & DELIVERY: All prices quoted are in Canadian Funds. For faster delivery, pay by certified cheque or money order. Personal cheques take two weeks to clear. At these prices, we do not provide Credit Card sales. We can provide all items on the TI Canadian price list. Add \$5.00 per order for postage & handling. Do not remit sales tax. All prices subject to change. Answering service: 403 481-0074; we'll call back collect. No direct sales.

**WHO'S GOT ONE
OF THE LARGEST
SELECTIONS OF
T.I. SOFTWARE?**

WE DO!

COMPLETE ONE STOP SHOPPING

SEND FOR FREE CATALOG



SOFT CITY

BOX 473

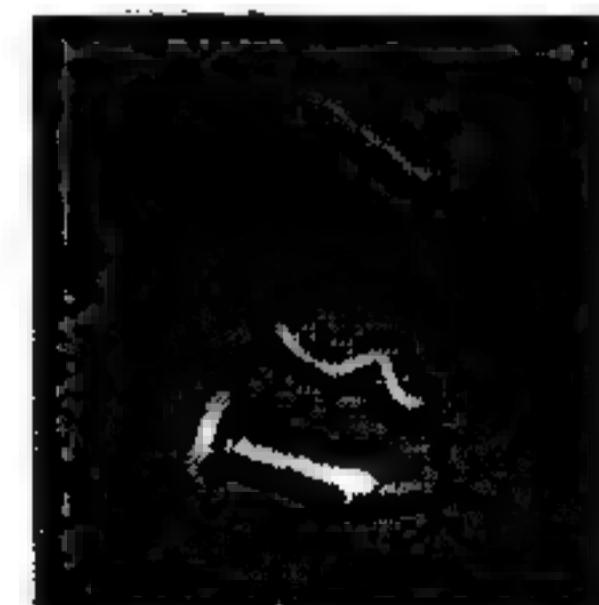
BIRMINGHAM, MI 48012



**The
TEX-SETTE™
Adapter**

**Cassette
Compatibility
At Last!**

If The TI-99/4A Will Not Control Your
Cassette Recorder Through Its Remote
Jack, We Have The Solution For You . . .



• Low cost - Only \$5.95
plus \$1.00 each for postage and handling.

99'er-Ware
INNOVATIVE PRODUCTS
FOR TMS9900-BASED
PERSONAL COMPUTING

P.O. Box 5537 Eugene, Oregon 97405
Tel. (503) 485-8796

DUST COVERS

Features:

- Equipment Protection
- Handsome Appearance
- Custom-Fit
- Antistatic Treated
- Quality Construction

A 10" Color Monitor Cover \$10.95
 13" Color Monitor Cover \$12.95
 Foot shown!
 B Peripheral Expansion Box Cover \$12.95
 C TI 99/4 Matrix Printer Cover \$9.95
 same as Epson MX-80 Cover
 D Cassette Recorder Cover \$4.95
 11 size fits up to 10" x 6"
 E TI 99/4A/2 Console Cover \$8.95
 F Speech Synthesizer Cover \$3.95
 G Peripheral Box Cover \$5.95
 (Specify 32K Memory Expansion
 RS232 Interface or Disk Controller)
 H Thermal Printer Cover \$8.95
 I Disk Memory Drive Cover \$5.95

Add \$2.00 shipping/handling
 for the first dustcover;
 50 cents for each
 additional cover.

99'er-WARE
 INNOVATIVE PRODUCTS
 FOR TMS9900-BASED
 PERSONAL COMPUTING

P.O. Box 5537
 Eugene, Oregon 97405
 Tel. (503) 485-8796

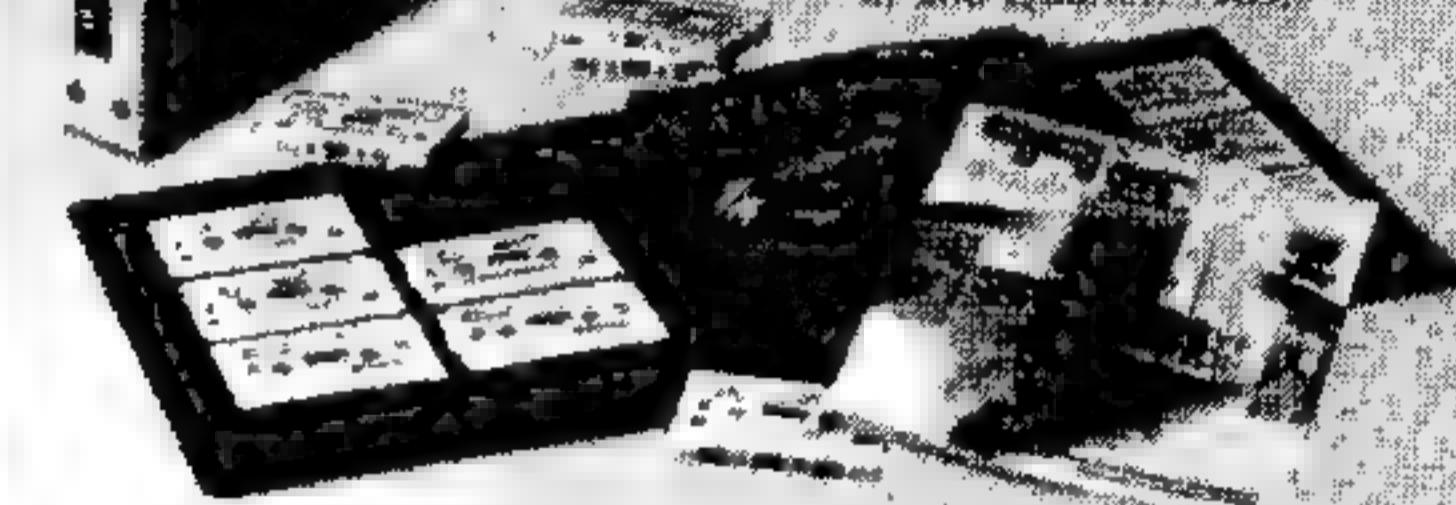
Keep Your Magazines & Tapes Together With a

99'er FINDER-BINDER

- Big enough to hold 6 magazines and 12 tapes
- Uses wire straps to hold magazines so that no hole punching is necessary
- Attractive and Durable

—Only \$10.95*

(magazines and tapes not included)
 FREE 99'er Master Index with each
 99'er Finder-Binder order
 (will be mailed when available
 in 2nd Quarter, 1983)



*Only \$10.95 without cassettes, plus \$3.00 shipping & handling
 6 High-Quality 99'er-ware C-10 Digital Computer Cassettes
 (with special BASF tape and 5-screw housing for data integrity)
 Available separately for \$7.00 plus \$2.00 shipping & handling

• SPECIAL: 99'er Finder-Binder that is packed

- with 6 of the above blank cassettes for only \$16.95
- with 12 of the above blank cassettes for only \$23.95

Add \$4.00 shipping & handling to either order.



P.O. Box 5537
 Eugene, Oregon 97405
 Tel. (503) 485-8796

TEXAS INSTRUMENTS HOME COMPUTER

Retail price \$225. Your special BACH Company price is a low \$149.95. Less TI \$50 REBATE - \$99.95! Order today
TOLL FREE 800-227-8292. In California call 415-969-6600.

TI Home Computer	.....	99.95	(includes rebate)
Peripheral Expansion System	.....	182.95	
RS-232 Card	.....	134.95	
Disk Controller Card	.....	192.95	
Expansion System Disk Drive	.....	297.95	
Maxell MD1 Single Side 5-1/4" Floppy Disk (10)	.....	29.10	
Memory Expansion Card	.....	228.95	
P-Code Card	.....	189.95	
Pascal Development System	.....	370.50	
Solid State Speech Synthesizer	.....	108.95	
Telephone Coupler	.....	158.95	
TI-Impact Printer	.....	559.00	
10" Color Monitor	.....	319.95	

**CALL FOR FREE
 EXPANSION BOX
 DETAILS**



99 4A

**CALL FOR
 FREE TI
 SOFTWARE
 LIST!**

The BACH Company
 715 ENSIGN WAY, PALO ALTO, CA 94303



**MICRO
 COMPUTERS
 CORPORATION**

• a member of the family

34 Maple Avenue • Armonk, NY 10504
 Telephone: (914) 273-6480

FREE NEWSLETTER & CATALOG

- THE FAMILY PROGRAMMER is a new newsletter for owners of TI home computers. It's filled with the latest news about TI hardware and software plus tips on computer maintenance and free programs to use and learn from.
- ALSO FREE: A complete catalog of TI products at low, low prices, including hundreds of programs for education & science, business & professional applications, games, music, utilities, languages and demos. Largest collection of educational software for the TI 99/4A ever assembled.

Don't miss this FREE offer. Put your name and address in an envelope and mail it today, or give us a call.



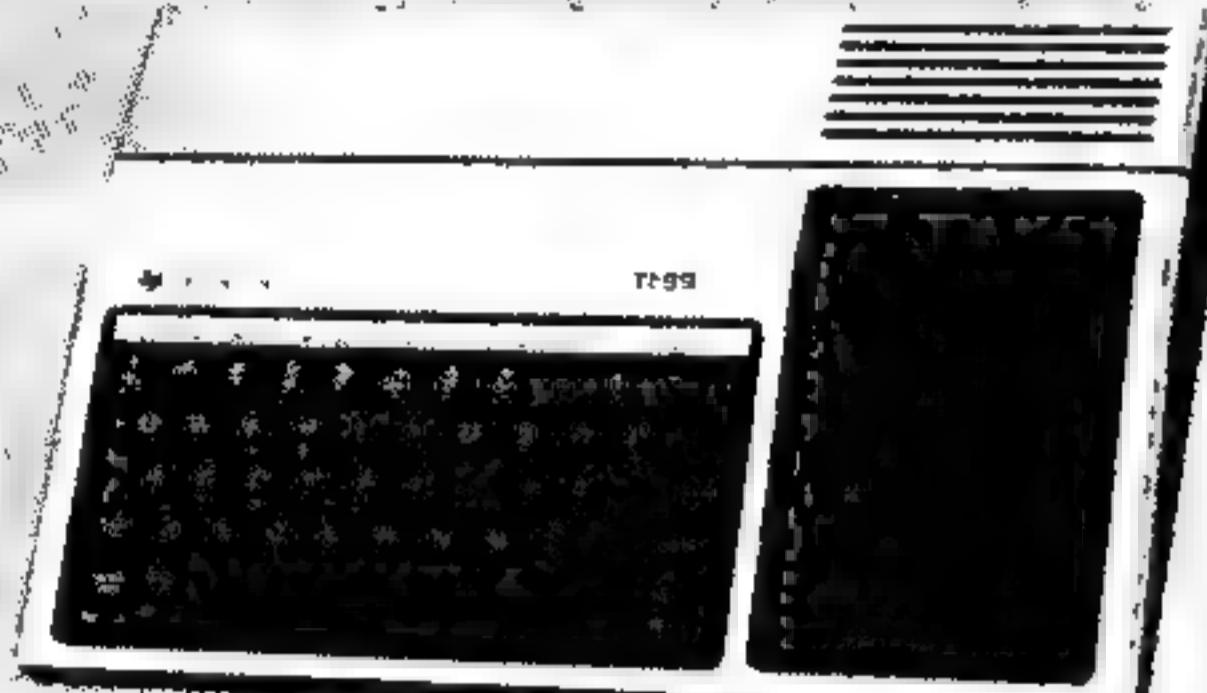
SAVE

SOUTHERN AUDIO VIDEO ELECTRONICS, INC.

1782 Marietta Blvd., N.W., Atlanta, Georgia 30318

**Texas Instruments TI-99/4A
Home Computer—\$109.00***

*After TI manufacturer's rebate of \$50.00.



Texas Instruments 10" Color Monitor PHA 4100—\$339.00.

Designed to handle the TI Home Computer's wide range of color, graphic and music capabilities with an extra sharp, clear picture and clean, clear sound.

PHP 1200 Peripheral Expansion System	\$179.95
PHP 1220 RS 232 Card	125.95
PHP 1240 Disk Controller Card	179.95
PHP 1250 Expansion System Disk Drive	287.95
PHP 1260 Memory Expansion Card (32K)	215.95
PHP 1270 P-Code Card	179.95
PHP 1280 Pascal Devel System	359.95
PHP 1600 Speech * Synthesizer	107.95
PHP 1600 Telephone Coupler (Modem)	143.95
PHP 2500 TI Impact Printer	499.00
PHP 1100 Wired Remote Controllers	24.95
PHP 2700 Program Recorder (Includes PHA 26221)	49.95

**We carry in stock all
hardware and software for
TI home computers.**

PHM 3026 Extended Basic	\$71.95
PHM 3035 Terminal Emulator II	35.95
PHM 3058 Mini-Memory	71.95
PHM 3055 Editor/Assembler	35.95
PHM 3109 TI Logo II	71.95
PHM 3113 Microsoft Multiplan	71.95
PHM 3111 TI Writer	71.95
PHM 3112 Parsec	28.95
PHM 3063 TI Invaders	28.95
PHM 3042T Tunnels of Doom	42.95
PHM 3041T Adventure (Pirate Adv.)	28.95
PHM 3057 Munch Man	28.95
PHM 3006 Home Financial Decisions	21.95
PHM 3044 Personal Report Generator	28.95
PHM 3002 Early Learning Fun	21.95
PHM 3090-97 Milliken Home Math Series K-8th grade	28.95
PHM 3059-62 Scholastic Spelling Level 3-6	39.95
PHM 3046-48 Scott, Foreman, Reading Pkgs.	39.95
PHM 3064 Touch Typing Tutor	28.95
PHM 7008 Speaking Scholastic Spelling	157.95
PHM 3122 Plato Interpreter	35.95
PHM 5201-5308 Plato Courseware Series	35.95
PHM 3083-88 Addison Wesley Computer Math Games I-VI	28.95

Get the best prices on TI hardware and software. For a complete listing of all SAVE's products, send \$5.00 for our catalogue (refundable with your first order).

Enjoy the convenience of in-home shopping. Call our toll free number today for orders only.

Use your American Express, VISA, Mastercard, check or money order. Minimum order of \$50. Shipping and handling charges are extra. All prices are subject to change without notice. Allow 2-4 weeks for delivery. Prices good through July 15, 1983. *50.00 TI Rebate expires January 1984.

**Order Toll Free 1-800-241-2682
In Georgia (404)-351-8459**

9-9-6A

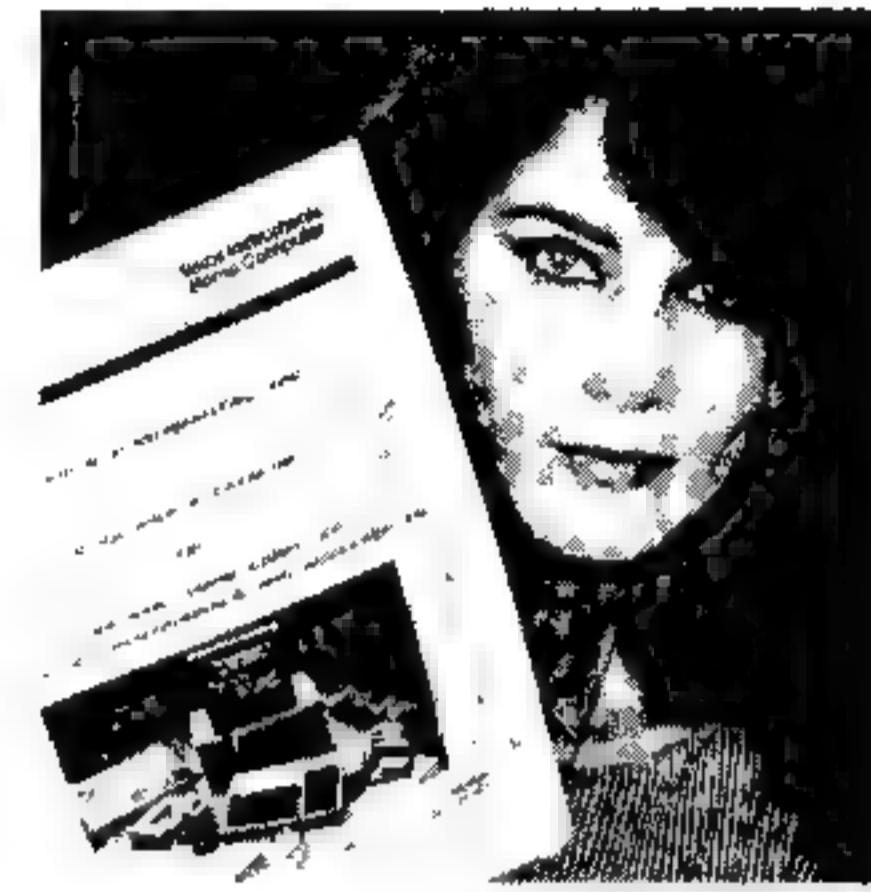
**TI HOME COMPUTER
ENCYCLOPEDIA/CATALOG**

from

UNISOURCE

Includes descriptions of hundreds of programs, peripherals and accessories for your TI Home Computer from TI, from 3rd party authors and from many other sources. Only \$3 plus \$1.50 postage.

You'll find virtually everything you need for your Home Computer and you'll automatically get future updates. Order it today...from Unisource.



Toll Free 1-800-858-4580

(Ask for Operator 18)

(In Texas call 1-806-745-8834)

We accept Visa and MasterCard. For mail-in orders, send to P.O. Box 64240, Lubbock, TX 79464.

UNISOURCE ELECTRONICS, INC.

**THE PERFECT
TEXAS INSTRUMENTS
TRADEOFF.**

Trade in your current Texas Instruments TI-99/4 Peripheral Accessories to the BACH Company and we'll give you credit towards the New TI Expansion Box and its peripherals.

Or, buy preowned, reconditioned TI-99/4

Peripheral
Accessories at
a Big savings
from the BACH
Company. Then,
when you're
ready,

trade them in for credit towards the Expansion Box System of peripherals.

In either case, be sure to CALL TOLL FREE 800-227-8292. And in California call 415-969-6601 or 415-494-1995 for prices and more

information about this exciting NEW TradeOff to improve your Texas Instruments Computer System.



THE BACH COMPANY

715 ENSIGN WAY, PALO ALTO, CALIFORNIA 94303



AUTHOR ZED DEALER

new
Available exclusively from TEX-COMP

TEX-COMP™
TI USERS SUPPLY COMPANY
"YOUR LUBBOCK CONNECTION™"

Proudly Introduces

SUPER JOY STICK II THE ONLY JOYSTICK THAT CAN CONTROL



THE MUNCH MAN!

**NEW PRODUCT
IMMEDIATE
DELIVERY**

RATED #1

August 1982 Creative Computing

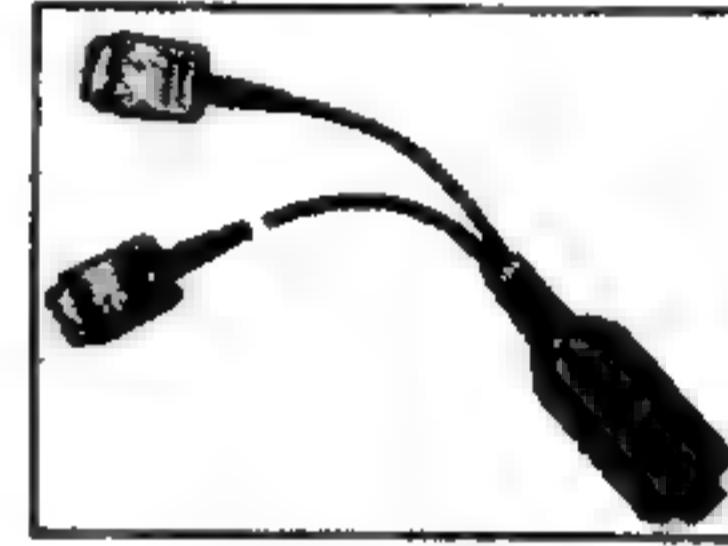
Improved version

The case has been redesigned for easy hand-held operation. The solid steel, short-throw control shaft with an arcade-style ball on the top offers precise, 8-position action. The "soft-touch" fire button is located at the top end of the molded base allowing either right or left-hand play. This improved fire button location is designed to take advantage of the greater dexterity of the index finger resulting in quicker response time and less fatigue during extended play.

SAME ACTION AS THE REAL ARCADE GAMES

- **SWITCHABLE GATE-PLATE™:** Setting the switchable gate-plate indicator to the 4-way position allows only horizontal or vertical motion dramatically improving response for maze-type games

Helps you make higher levels of Munchman ... if you're fast enough.



**WITH FREE
Port Expander**



Add 3% for Visa or MC

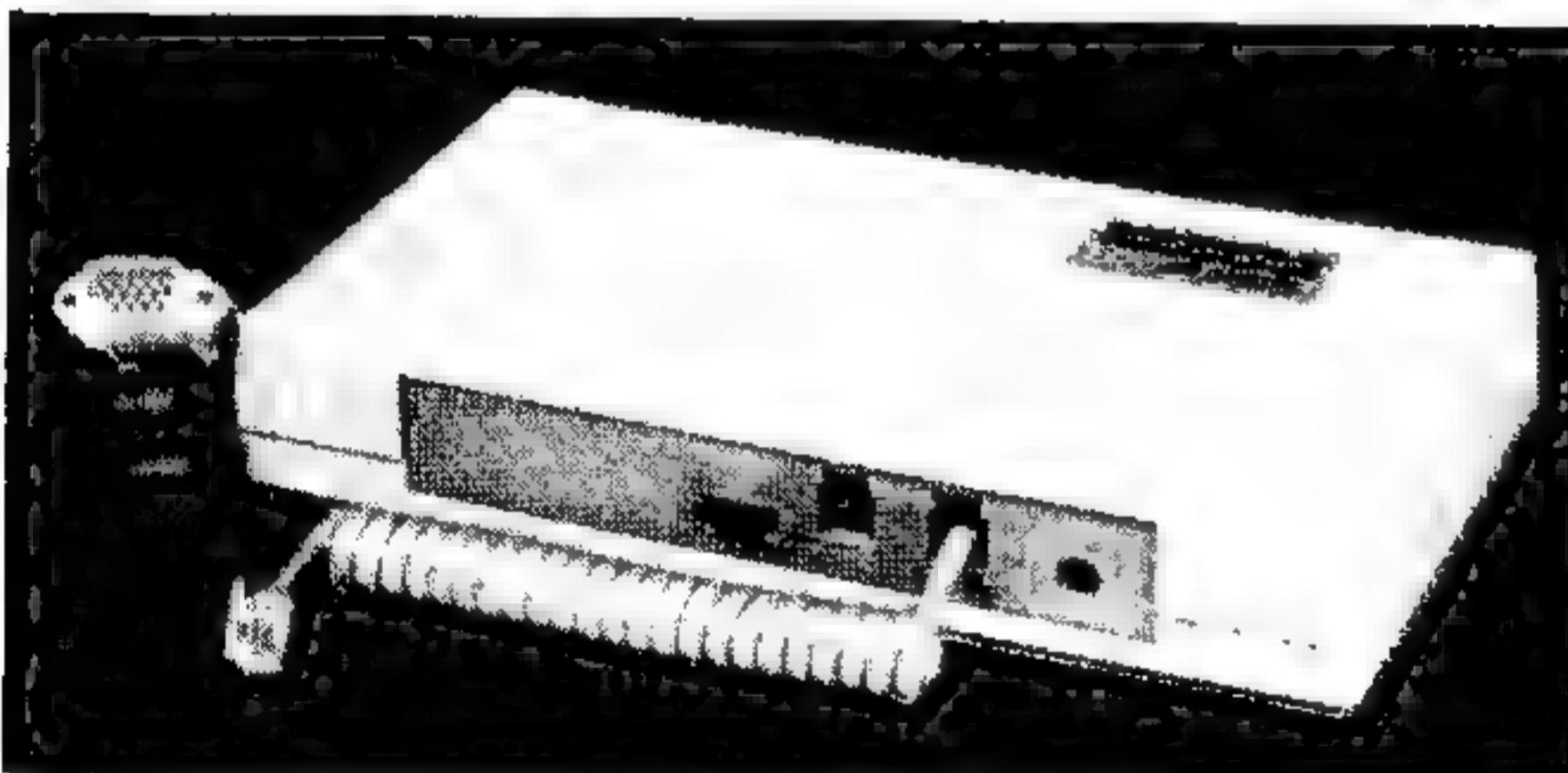
*CONTINENTAL U.S.

**\$34.95
FREE SHIPPING
2ND UNIT ONLY 29.95**

Send Check or Money Order to: **TEX-COMP • P.O.BOX 33084 • GRANADA HILLS, CA. 91344 • (213) 366-6631**
SEND FOR FREE ORDER KIT AND COMPLETE PRICE LIST
CONTAINS MONEY SAVING SPECIAL OFFERS AND NEW PRODUCT INFORMATION



TEX-COMP™
USERS SUPPLY DIVISION



SPECIFICATIONS

Data Format: Serial, binary, asynchronous
Operate Mode: Manual dial, Automatic ANSWER/ORG selection
Data Rate: 0 to 300 bps, full duplex
Modulation: Frequency shift-keyed (FSK)
Line Interface: Direct-connect
Data Interface: RS-232C compatible, built-in cable to computer
Transmit Frequency: MARK ORIG ANSW
MARK 1270 Hz 2225 Hz
SPACE 1070 Hz 2025 Hz
Transmit Frequency Accuracy: ± 0.01%

Meet the direct-connect SIGNALMAN MARK III designed for use with your TI-99/4A Accessories Interface—the smallest, lightest, most compact modem available today. Its long, 9-volt internal battery and exclusive audible detect signal allow you to install the SIGNALMAN anywhere out of the way and out of sight. Now there's no need for messy cables and no need to look at a LED to verify carrier.

Anchor Automation has taken the fuss out of communications. For business or fun, SIGNALMAN is the ideal modem.

This unit interfaces between the receiver and handpiece of standard Bell modular phones. Phones with dials in the handpiece or without a modular cord between the receiver and handpiece or without a modular cord between the handpiece and receiver, will require an optional adapter.

Comes complete with cable and cord. This is a unit specially designed for the TI-99/4A and should not be confused with other Anchor/Signalman models that sell for less and/or are not compatible with the TI-99/4A.

Send for our free Order Kit — discounts on entire product line

©1982 CALVERT ENGR. INC.

Transmit Level
Receive Frequency
MARK SPACE ORIG 2225 Hz 2025 Hz ANSW 1270 Hz 1070 Hz
Receive Frequency Tolerance ± 0.5% ± 0.5%
Carrier Detect Threshold 44 dBm typical
Carrier Detect Indicator Audible tone
Power Requirement Internal 9V transistor battery* or 110 VAC through adapter
Size 8 1/4" x 4 1/4" x 1 1/4"

*Not included
Your SIGNALMAN transmits both voice and data over all common telephone lines, and is fully compatible with Bell 103 modems, putting your computer in instant communications with thousands of other computers. And when you're in the data position, your SIGNALMAN automatically changes from ORIGINATE to ANSWER and back again as the need arises, ending all that confusion.

Proudly Introduces
The SIGNALMAN™ MARK III
TI 99/4A COMPATIBLE

MODEM

Finally, a low cost, direct connect, high quality and super reliable TI-99/4 and 99/4A compatible modem that comes complete and ready to use — just plug it into a TI RS/232 interface or expansion card.

**Mfg.
Suggested
List Price
\$139.00**

TEX-COMP PRICE
Limited-Time Introductory Offer

\$94.95

Including shipping & insurance

**\$100.00 SPECIAL \$100.00
FREE Source/TEXNET
sign on & first hour
with purchase
of Signalman MK III
Offer Expires 6/83**

ACCESSORIES:
9V-DC
Power Supply
\$10.95 p.p.

Mail Check or Money Order to: Tex-Comp
P.O. Box 33084, Granada Hills, CA 91344
213-366-6631

VISA/Mastercharge—add 3% for credit card orders. Send Cashiers Check or money order to avoid delay. Calif. orders add 6 1/2% sales tax.



Authorized Dealer

TI-99/4A
84.95
Less Modulator
With Rebate
Effective 6-1-83
see details below

TEX-COMP™

TI USERS SUPPLY COMPANY

"YOUR LUBBOCK CONNECTION™"

TI-99/4 PRODUCTS AT PROFESSIONAL PRICES



ATTENTION TI-99/4 USERS — TEX COMP HAS BEEN SUPPORTING THE ENTIRE 99/4 PRODUCT LINE TO PROFESSIONAL AND INDUSTRIAL ACCOUNTS, SINCE THE INTRODUCTION OF THE TI 99/4. NOW YOU CAN PURCHASE ALL YOUR TI-99/4 REQUIREMENTS FROM ONE SOURCE AT LOW "PROFESSIONALLY DISCOUNTED" PRICES ON THE ENTIRE 99/4 PRODUCT LINE. WE ARE A DIRECT TI NATIONAL ACCOUNT AND DEAL DIRECTLY WITH TI, ASSURING YOU THE BEST SERVICE, EARLIEST SHIPMENT AND LOWEST POSSIBLE PRICES

SEND FOR FREE ORDER KIT AND COMPLETE PRICE LIST
CONTAINS MONEY SAVING SPECIAL OFFERS AND NEW PRODUCT INFORMATION

FREE SHIPPING ON SOFTWARE ORDERS OVER \$100. (PHD, PHM, PHT)

TI-99/4 PRODUCT LINE

Your Cost

CONSOLE	
PHC 004A	TI-99/4A Home Computer (Less Modulator) Color TV RF Modulator (14.95 with computer) * Less 350.00 Rebate direct from TI
	50.00
	99.95
	84.95
PERIPHERALS	
PHP 1200	Peripheral Expansion System
PHP 1220	RS-232 Card
PHP 1240	Disk Controller Card* (One Disk Manager module packed with each Disk Controller)
PHP 1250	Expansion System Disk Drive (Disk Drive Controller required)
PHP 1260	Memory Expansion Card (32K RAM)
PHP 1270	Pascal Development System — Includes P-Code Card (PHP 1270) UCSD Pascal™ Compiler (PHD 5063)
PHP 1280	UCSD P System Assembler Linker (PHD 5064) and UCSD P System Editor/Fixer Utilities (PHD 5065)
	(32K Memory Expansion, Disk Drive and Controller are required)
PHP 1500	Solid State Speech™ Synthesizer
	107.95
NEW	
	Cassette recorder & cable 59.95
PHP 1850	Disk Memory Drive (Disk Drive Controller required)
PHP 2500	TI Impact Printer
	519.95
PHA 2100	R.F. Modulator (TV Adapter)
PHA 4100	10" Color Monitor
	312.95
OPTIONAL ACCESSORIES	
PHP 1100	Wired Remote Controllers (Joysticks) (Pair)
PHA 2000	Du-Cassette Cable
	10.95
APPLICATION PROGRAMS	
Home Management Personal Finance	
PHM 3006	Home Financial Decisions
PHM 3007	Household Budget Management (Data storage system is recommended)
PHM 3012	Securities Analysis
PHM 3013	Personal Fin. and Keeping Data storage system is recommended)
PHM 3018	Tax Investment Record Keeping (Disk system is required)
PHM 3022	Personal Real Estate Data storage system is recommended)
PHM 3044	Personal Report Generator Disk storage system is recommended and PHM 3113 is recommended)
PHM 3111	TI Writer 32K Memory Expansion RS232 Printer Disk Drive and Controller are required Available for TI-99/4A only
	74.95

TEX-COMP USERS SUPPLY
P.O. BOX 33084, GRANADA HILLS, CA 91344

213-366-6631

HOT LINE

PHM 3113	Microsoft™ Multiplan 32K Memory Expansion Disk Drive and Controller required RS-232 and Printer are recommended	74.95	PHM 3024	Indoor Soccer	22.95
PHD 5001	Mailing List	53.95	PHM 3025	Mind Challengers	10.95
PHD 5003	Personal Financial Aids	19.95	PHM 3030	A Maze-ing	19.95
PHD 5021	Checkbook Manager	19.95	PHM 3052	Tombstone City 21st Century	30.95
PHD 5077	Personal Tax Plan (Advanced Software Inc.) P-Code and 32K Memory Expansion are required RS-232 and Printer are recommended	74.95	PHM 3053	TI Invaders	30.95
	Cassette	11.95	PHM 3054	Car Wars	30.95
	Personal Financial Aids Business Aids Library — Lease Purchase Decisions (Printer is recommended)	46.95	PHM 3057	Munch Man	30.95
			PHM 3042D	Tunnels of Doom (2 Diskette Games included)	42.95
			PHM 3042T	Tunnels of Doom (2 Cassette Games included)	43.95
			PHM 3056	Alphair	30.95
			PHM 3110	Choplain Trail	30.95
			PHM 3112	Parsec	30.95
			PHM 3031	Monster Bradley Packages (Developed by Milton Bradley Company)	
			PHM 3032	The Attack	30.95
			PHM 3033	Bingo	10.95
			PHM 3034	Blackjack and Poker†	10.95
			PHM 3036	HiScore	10.95
			PHM 3037	ZeroZap	15.95
			PHM 3038	Hangman	15.95
			PHM 3039	Connect Four	15.95
			PHM 3040	Vankee	15.95
			PHM 3041	Adventure International Packages (Developed by Scott Adams)	
			PHM 30410	Adventure — Pirate Adventure Diskette Game included)	37.95
			PHM 30411	Adventure — Pirate Adventure Cassette Game included)	37.95
			PHM 3067	General Industries Packages (Developed by General Industries)	
			PHM 3067	Orchid (Developed by General Industries)	30.95
			PHM 6046	OF PHD 5046 Adventureland	22.95
			PHM 6047	OF PHD 5047 Mission Impossible	22.95
			PHM 6048	OF PHD 5048 Voodoo Castle	22.95
			PHM 6049	OF PHD 5049 The Count	22.95
			PHM 6050	OF PHD 5050 Strange Odyssey	22.95
			PHM 6051	OF PHD 5051 Mystery Fun House	22.95
			PHM 6052	OF PHD 5052 Pyramid of Doom	22.95
			PHM 6053	OF PHD 5053 Ghost Town	22.95
			PHM 6054	OF PHD 5054 Savage Island I & II	30.95
			PHM 6056	OF PHD 5056 Golden Voyage	22.95
			PHM 6057	Cassette	
			PHM 6046	Texas Instruments Packages	
			PHM 6010	Mystery Mt. 30	7.95
			PHM 6015	Oldies But Goodies — Games I	10.95
			PHM 6017	Oldies But Goodies — Games II	15.95
			PHM 3042	OTHER APPLICATION PROGRAMS	
			PHM 3011	Command Modules	
			PHM 3014	Speech Editor Solid State Speech — Synthesizer Recommended	30.95
			PHM 3026	Statistics Data storage system required	30.95
			PHM 3028	Extended BASIC	74.95
			PHM 3035	Terminal Emulator II	30.95
			PHM 3055	Editor Assembler Disk System and 32K RAM Memory Expansion required	74.95
			PHM 3058	MM Memory	74.95

POSTPAID TI 99/4A ACCESSORIES FROM TEX-COMP



NEW — SIGNALMAN MARK III MODEM FOR THE 99/4 and 99/4A—DIRECT CONNECT.

INTRODUCTORY OFFER — \$94.95 POSTPAID (Sub. List \$139.)

TEX-NET™ SPECIAL — TERMINAL EMULATOR II only \$34.95

When purchased with Mark III Modem.

SPECIAL
with purchase
FREE Source/Tex-Net
sign on and hour use
\$100. value

Comes Complete with the Computer Interface Cable and Telephone Cord. Other Modems Require Separate \$20-\$30 Purchases

OPTIONAL 9 V BATTERY ELIMINATOR \$10.95 POSTPAID

Beanstalk™ Adventure

The ultimate adventure game based on the classic fairy tale, Jack and the Beanstalk. Now for the TI-99/4 and TI-99/4A.

Minimum Configuration required

1 TI-99/4 or 99/4A console

\$17.95

2 1 Disk Drive and Controller

including shipping and handling.

3 32K Memory Expansion

*Not available on cassette

4 Extended BASIC Module

*Not available on cassette

WICO COMMAND CONTROL JOY STICKS

IMPORTANT—Joy Sticks require TI adapter \$10.95 with Joy Stick.

Joystick 15-9714 \$26.95
Extra-long straight shaft handles give you more smooth and ready fits of 8 standard positions. Low-profile heavy-duty plastic base.

Famous Red Bell™ Joystick 15-9730 \$29.95

—Analog-type red bell handle that moves smoothly and easily fits of 8 standard positions. Low-profile heavy-duty plastic base.

The COMMAND CONTROL trackball \$57.95

—Features joystick-related modular operation. Phenolic base provides unique 360 degrees movement to an infinite number of positions, can also be used to vary the speed of on-screen objects. Quick-action fire button next to the ball, for smooth, two-handed control.

*Master Instruments model—72-7000

SPECIAL — \$15.95 POSTPAID
JOYSTICK ADAPTER — Allows two Atari wired Joy Sticks to be used with 99/4 or 99/4A. \$10.95 with any WICO Joystick

SPECIAL — \$15.95 POSTPAID
Head Cleaning Kit • Convenient and easy to use remove the debris contaminating drive heads

Flip 'N' File™ For TI Modules and Cassettes \$27.95 POSTPAID

Flip 'N' File™ For 51/2" Disk Drives \$23.95 POSTPAID

SPECIAL — 10 PREMIUM GRADE HUB-REINFORCED DISKETTES & FREE PLASTIC LIBRARY CASE



TI-99/4A compatible

\$24.95 POSTPAID

SPECIAL — 8 DATA QUALITY C-11

Cassettes (BASF) In FREE Plastic storage case

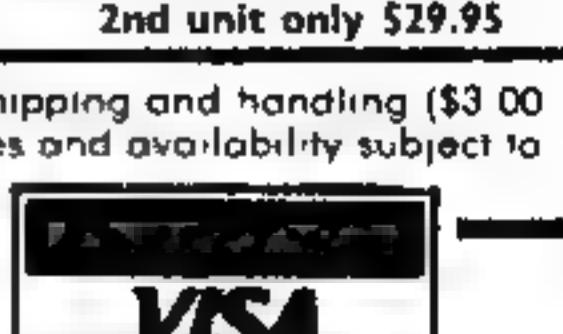
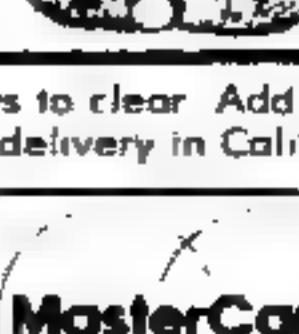
\$9.95 POSTPAID



TI-99/4A compatible

NEW SUPER JOYSTICK II RATED #1

A commercial arcade joy stick adapted for use with your 99/4 or 99/4A. 2-way setting for Munchman and Parsec-a Tex-Comp exclusive \$34.95 postpaid WITH FREE 2 PORT ADAPTER 2nd unit only \$29.95



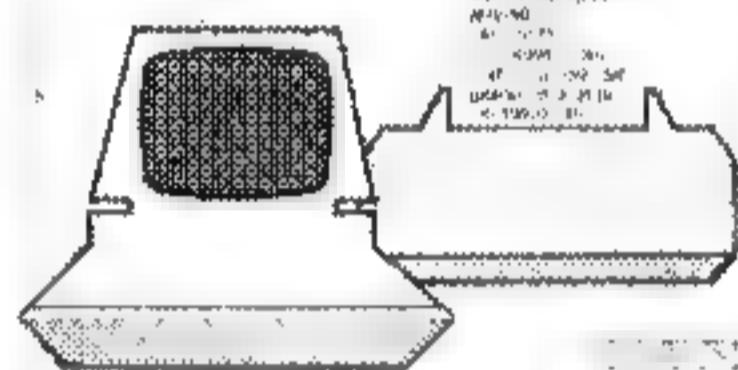
TERMS: All prices F.O.B. Los Angeles. For fastest service use cashier's check or money order. Personal checks take at least ten days to clear. Add 3% shipping and handling (\$3.00 minimum). East of Mississippi 4 1/2%. (Free shipping on all software orders over \$100 and on postpaid specials). Add 6 1/2% S.T. for delivery in Calif. Prices and availability subject to change without notice. We reserve the right to limit quantities. This ad supersedes all previous ads.

Credit Cards add 3%

Beginner's Guide for the UCSD Pascal System

BASIC Computer Programs for Business

Volume 2
Charles D. Sternberg



NEW

BASIC COMPUTER PROGRAMS FOR BUSINESS: VOL. 1

By Charles D. Sternberg.

Each program is documented with a description of its functions and operation, a listing in BASIC, a symbol table, sample data and one or more samples

Volume 1 contains over 35 programs covering budgets, depreciation, cash flow, property comparisons, accounts payable, order entry, warehouse locations, inventory turnover analysis, job routine resource allocation, production scheduling, etc.

paper, \$12.95
1980, 384 pages, 7 x 10

BASIC COMPUTER PROGRAMS FOR BUSINESS: VOL. 2

By Charles D. Sternberg.

A collection of programs (with function and operation documentation) covering the critical facets of business operation: sales planning and analysis, personnel word processing, mailing lists, price list systems, record control, scheduling systems, etc.

paper, \$13.95
1982, 376 pages, 7 x 10

NEW

BEGINNER'S GUIDE FOR THE UCSD PASCAL SYSTEM

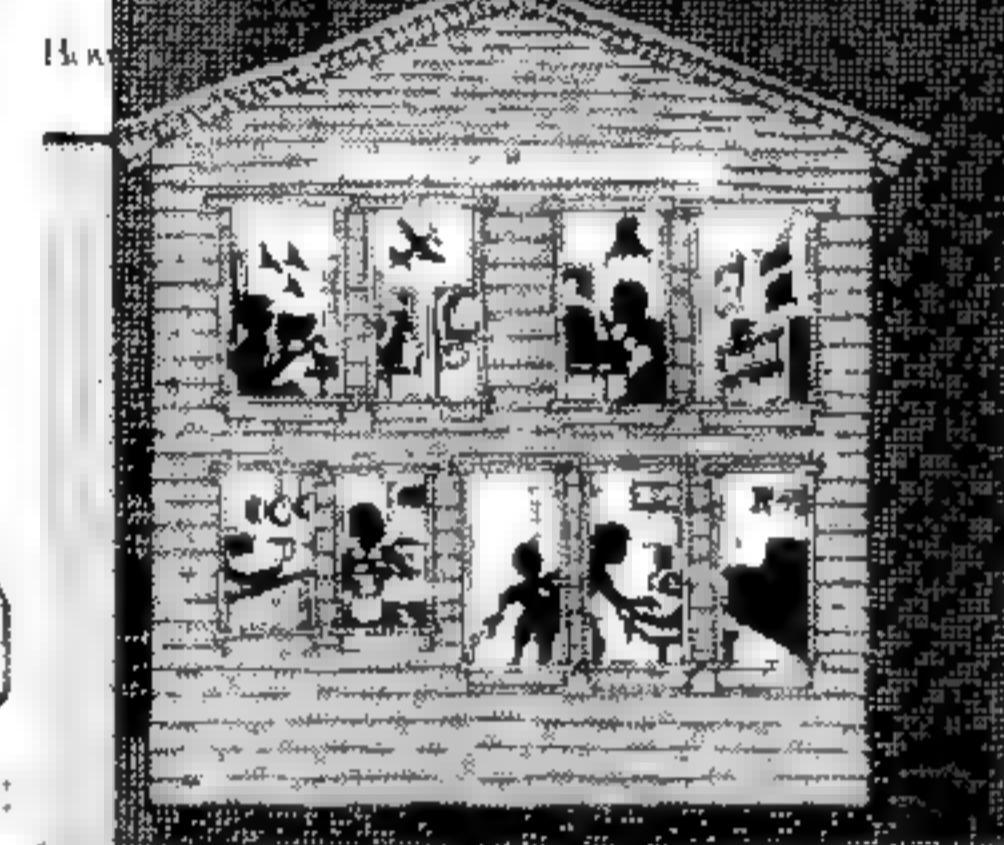
By Kenneth Bowles.

This highly informative book is written by the originator of the UCSD Pascal System. It is designed as an orientation guide for learning to use the UCSD Pascal System and features tutorial examples of programming tasks in the form of self-study quiz programs. Once familiar with the system you will find the guide an invaluable reference tool for creating advanced applications.

paper, \$12.95
1980, 204 pages, 6 x 9



BASIC Computer Programs for the Home



BASIC COMPUTER PROGRAMS FOR THE HOME

By Charles D. Sternberg.

An invaluable book containing over 75 practical home application programs that will be helpful to the novice or experienced owner in increasing the usefulness of any home computer. Each program is documented with a description of its functions and operation, a listing in BASIC, a symbol table, sample data, and one or more samples

paper, \$11.95
1979, 336 pages, 7 x 10, illus

GAME PLAYING WITH BASIC

By Donald D. Spencer.

Enjoy the challenge of competition with your computer. Amuse yourself with such games and puzzles as 3-D Tic-tac-toe, Nim, Roulette, Magic Squares, the 15 Puzzle, Baccarat, Knight's Magic Tour, and many others. The writing is nontechnical, allowing almost anyone to understand computerized game playing

paper, \$11.50
1977, 176 pages, 6 x 9, illus

BASIC COMPUTER PROGRAMS IN SCIENCE AND ENGINEERING

By Jules H. Gilder.

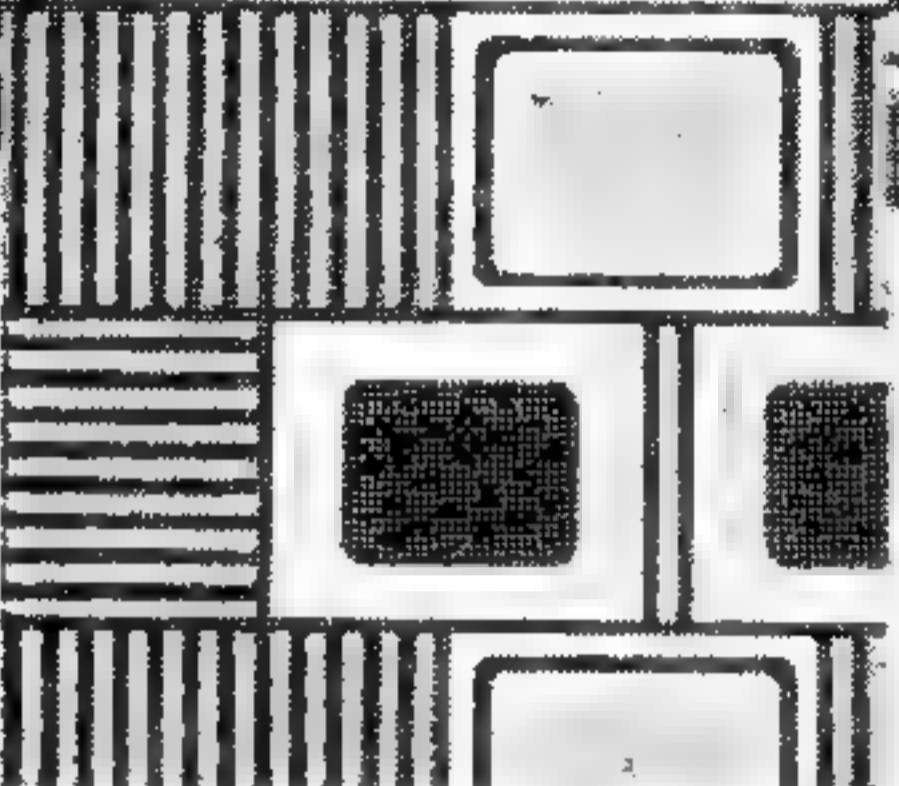
Save time and money with this collection of 114 ready-to-run BASIC programs for the hobbyist and engineer. There are programs to do such statistical operations as means, standard deviation, averages, curve-fitting, and interpolation. There are programs that design antennas, filters, attenuators, matching networks, plotting, and histogram programs

paper, \$11.95
1980, 160 pages, 6 x 9, illus



TI BASIC

INTRODUCTION TO



PRACTICAL BASIC PROGRAMS

Edited by Lon Poole

Here is a new collection of 40 programs you can easily key in and use on most microcomputers. Each program does something useful. Practical BASIC Programs is especially useful in small business applications. It solves problems in finance, management, decision, mathematics and statistics. It requires no prior programming knowledge. Each program is thoroughly documented. The book contains sample runs, practical problems, BASIC source listings, and an easy-to-follow narrative to help you realize the potential uses of each program

paper, \$16.50
1980, 200 pages, 8 1/2 x 11



INTRODUCTION TO PASCAL (INCLUDING UCSD PASCAL)

By Rodney Zaks

This is the first book on Pascal that can be used by persons who have never programmed before but more generally it is a simple and comprehensive introduction to standard and UCSD Pascal for anyone—beginner to experienced programmer—who wants to learn the language rapidly. The logical progression and graduated exercises—designed to provide practice as well as test skill and comprehension—enable the reader to begin writing simple programs almost immediately

paper, \$16.95
1981, 440 pages, 7 x 9

BEAT THE ODDS: MICROCOMPUTER SIMULATIONS OF CASINO GAMES

By Hans Sagan

Here's an extremely useful programming guide that provides realistic simulations of five popular Casino games: Trente-et-Quarante (Thirty and Forty), Roulette, Chemin-de-Fer, Craps and Blackjack. Each of the five chapters has the same structure. It begins with a computer run displaying facets of the programs, followed by an explanation of the objectives and the physical execution of the game. Acceptable bets and how to place them are discussed and systems and/or strategies laid out. Finally, the computer program is developed and various modifications of the program are detailed

paper, \$9.95
1980, 128 pages, 6 x 9

Use the order card in the back of this magazine, or itemize your order on a separate piece of paper and mail to:

99'er Magazine/Book Dept., P.O. Box 5537, Eugene, Oregon 97405. Be sure to include check or detailed credit card information. Shipping and Handling: In U.S.A.—\$2.00 for one book; 75¢ for each additional book. Foreign Surface—add \$2.00 of total U.S.A. shipping costs. Please allow 4-6 weeks for delivery.

If there is a question regarding your order please write to Customer Service at the above address.

PRICES SUBJECT TO CHANGE WITHOUT NOTICE.

YOU'VE FOUND IT!

Great Quality Products at Super
Discounts from your friends at **TENEX**
Computer Marketing Systems

Smith-Corona® TP-I Letter Quality Electronic text printer

\$499!

Our price \$549, Smith-Corona
Consumer Rebate - \$50.
YOUR FINAL COST \$499!
(for printers purchased
June 1, thru July 31)



- DAISY WHEEL PRINTER
- MICROPROCESSOR ELECTRONICS
- SIMPLE, RELIABLE MECHANISM

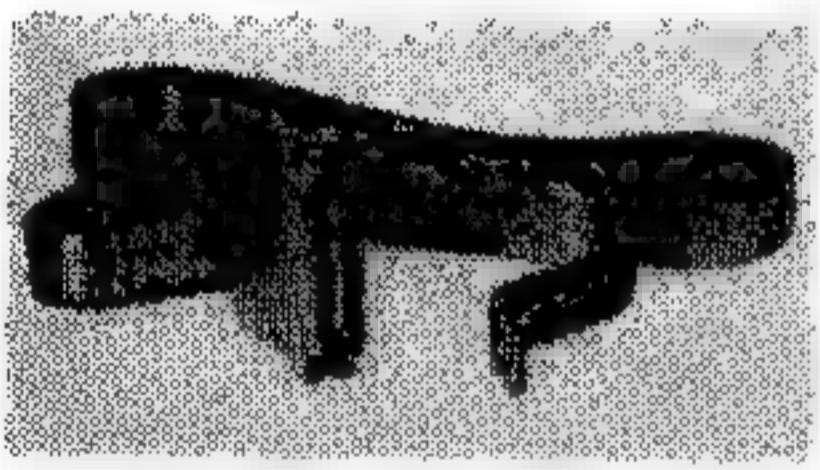
The Smith-Corona TP-I text printer is a microprocessor-controlled daisy wheel printer which delivers fully formed executive quality printout at speed of 120 words per minute. Uses highest quality carbon film or economical nylon ribbon. Change fonts easily with an inexpensive daisy wheel available from any Smith-Corona typewriter dealer (ribbons too).

TP-I comes standard with ten character per inch and parallel interface. Twelve character per inch and/or serial interface are no-cost options.

TI/CEN® Parallel Interface Cable containing an electronic circuit that is necessary to connect the TP-I to TI's RS-232 parallel port. Just plug it in and print away - Guaranteed! Regularly \$37.95, only \$27.95 with the purchase of TP-I. Five feet long.

Okidata Parallel Cable - Guaranteed 37.95
EPSON, Star Micronics, or Prowriter Cable - Guaranteed 24.95
RS 232 Serial Cable - Guaranteed 24.95

PLUS!



TENEX Computer Marketing Systems, Box 6578, So Bend, IN 46660 Phone (219) 227-7726

MAIL ME TODAY!! (Use this convenient form or copy your own) Order Toll-Free 1-800-348-2778

Send me the **FREE** "Everything Book for TI Home Computer" Containing over 600 quality program offerings plus hundreds of useful hardware and accessory items. **NO PURCHASE NECESSARY!**

NAME _____

ADDRESS _____

CITY/STATE/ZIP _____

PHONE () _____

Mail To: **TENEX**, Box 6578, South Bend, IN 46660



Pay by Check, Visa, or MasterCard
Card No. _____

Expiration Date _____

How many

DUST COVER SPECIAL @4.95

One Joystick + Adapter @33.95

Two Joystick + Adapter @52.95

"Kids" Book @ \$19.95

Smith-Corona TP-I Printer @549.00

TP-I Printer Interface Cable @37.95

Okidata parallel Interface Cable @37.95

EPSON, Star, Pro. parallel Interface Cable @24.95

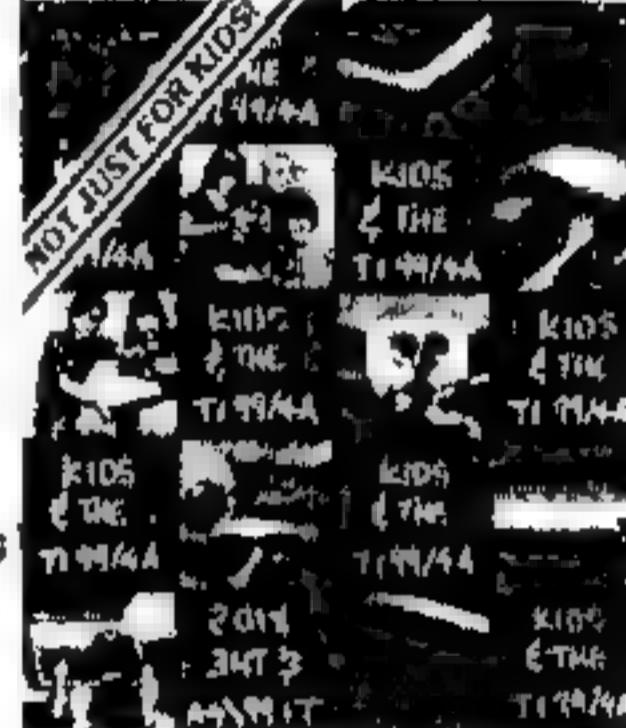
RS-232 Serial Cable @24.95

Shipping & Handling

\$1.75

Ind. Res. Add 5% tax

Total



Example programs are easy to understand and useful to have. Computer graphics and drawings in full color, games and quizzes, organize your mind and think creatively! AND BEST OF ALL ITS FUN.

236 pages, softcover, spiral bound. (Seventh grade level and above.) **\$19.95**

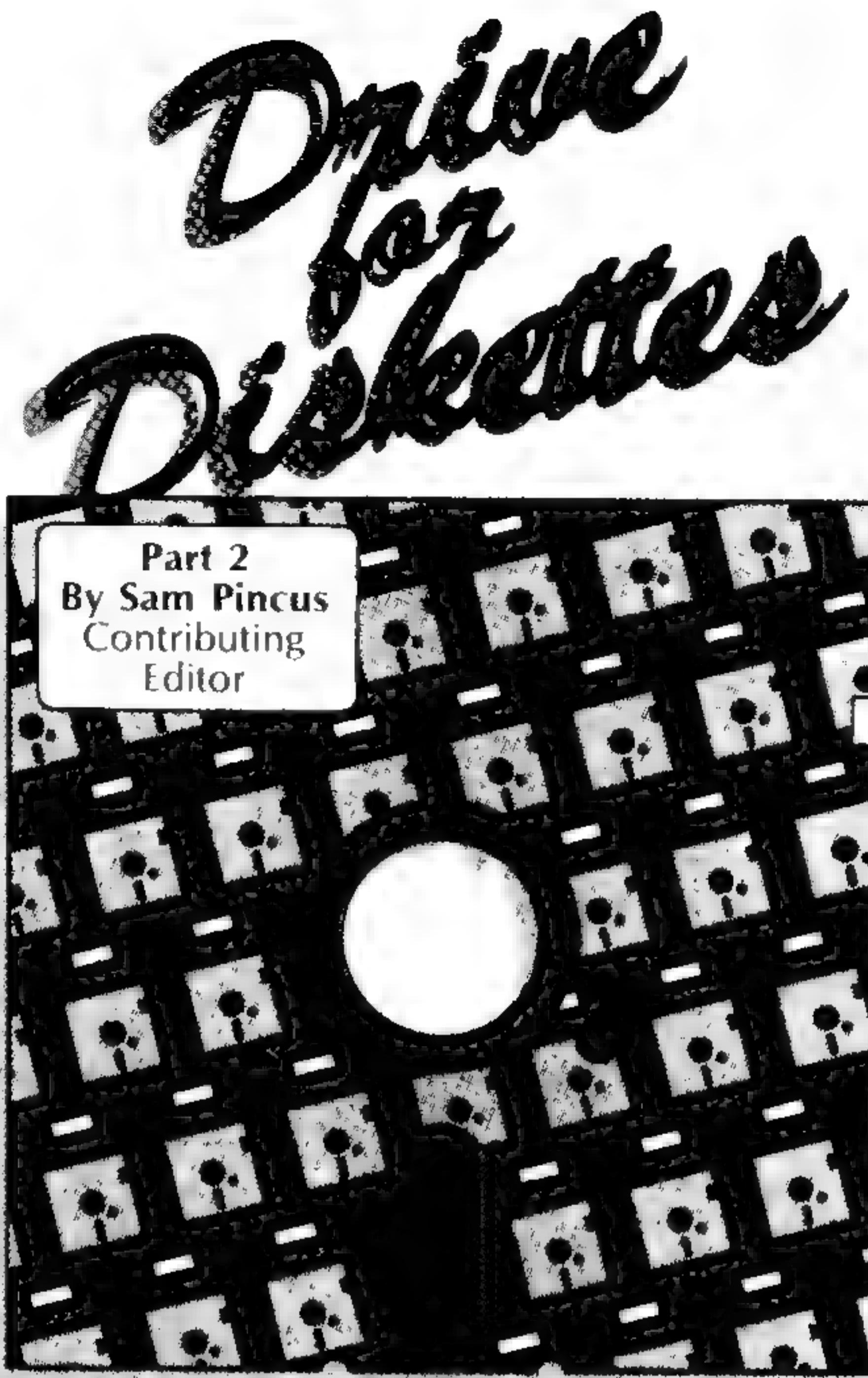
In Part One of this article we looked at the hardware you need to run TI's Disk Operating System (DOS). In Part Two we'll talk about DOS software—the computer code itself—how it works and how you can use it for sequential and relative file housekeeping.

The Disk Operating System

The DOS is the computer code you need to handle both disk and file housekeeping. It is the programming that makes *soft sectoring* work and manages files as part of your BASIC programs. Before we get into the details, let's go over how disk usage is organized. First of all, one major difference between tape and disk is that each disk has a permanent name. Even though you can reference a disk drive as DSK1 (similar to CS1), you can also reference a particular disk by its name. To illustrate, let's look at a disk called BASIC01. We know that it is broken up into tracks and sectors, but that is how the disk is hardware configured. What we need to find out now is how it is configured in terms of software by the DOS.

Just as you can have more than one program stored on a single magnetic tape, you can store many programs (or files) on BASIC01. The DOS reserves the first two sectors of the disk for a *directory*. This is similar to a book's table of contents. It keeps track of all the data located on the disk. There is a directory entry for each program or file located on the disk, with enough room for 128 different entries. Suppose you want the computer to get a program called *Doomcastle* from the disk. You can do it by entering OLD DSK1.DOOMCASTLE (assuming that my disk called BASIC01 is located in disk drive 1). You can also do it by entering OLD DSK.BASIC01.DOOMCASTLE (which means that I am asking the DOS to look for BASIC01 on any disk drive).

Once the DOS locates the proper disk it searches the directory for the program. The directory entry points to the exact track and sector where the program can be found. The read/write head moves directly to that track, and as soon as it gets to the proper sector in the track, it starts reading. This is one reason why disk access is so much faster than tape cassettes. The disk does not need human intervention to turn it on or rewind it, and it doesn't have to read through a lot of unnecessary data before it gets to the place where the information you want is stored. In addition, a disk drive is capable of reading this data and passing it on to the controller (and from there into the computer) about 100 times faster than a tape recorder can.



If you want to write out a sector of information to BASIC01, the DOS follows the same procedure: First, it locates the disk; then it finds the first available track on the disk (also from the directory). Finally, the read/write head moves to that area, and the disk drive starts writing out the data. And, after the data is written out, it is automatically reread and immediately verified. That's a handy feature of writing data to a disk: no need to rewind and do a separate verification as in tape!

Full Sector Blocking

In order to minimize disk reads and disk writes, the DOS takes 2K of RAM away from your 99/4A and uses them for *buffers* (one for each file). When you write data to a part of a sector, it is really written to a buffer in RAM. Only when the information for an entire sector is ready, does the DOS actually write out to the disk. Likewise, a buffer in RAM will hold the entire contents of a sector when you want to read data from it. Then, if you want to read more data from the same sector, the DOS gives you the data from the buffer without having to reread from the disk. This technique is called *full sector blocking*, meaning that the operating system always processes programs or data one sector at a time.

If the data uses more than 255 bytes (as does our example program, *Doomcastle*),

it must be read or written a sector at a time. If the information uses less than a full sector, you must be sure to CLOSE your data file or type BYE before leaving the program. Then the unused bytes in the sector will be filled with zero bits, and the DOS will understand that it is to write out the data to the disk even if the buffer is not filled a full sector's worth. No other data file will be able to use that sector.

Two Parts of the DOS

The TI-99/4A's DOS has two major components: the *Disk Manager* Command Cartridge (which comes free with each disk controller) and the code inside your TI-99/4A console. The *Disk Manager*, which contains the program code for all of the housekeeping functions not needed to run a program, performs several jobs. It will initialize a disk by establishing the sectors on each track and filling them with an initialized pattern (there's that "soft-sectoring" again!). It can also copy files between disks for backup, name or rename a disk or file, delete (remove) files or programs from a disk, and print the contents of the disk directory. In addition, it gives you the means to set a *deletion protect* switch which prevents you from accidentally deleting or

replacing a file or program. This is a neat function seldom found on microcomputers. The functions and operations of the *Disk Manager* are spelled out in detail in the manual that comes with the disk controller. The manual also outlines how to set up the controller and your TI disk drives, initialize disks and name them, and how the various housekeeping functions operate. It also provides a good background on file- and disk-naming conventions. I won't repeat that information here, but I will say that as in most TI manuals, the information is straightforward and it includes enough examples to give you a good idea of how things work.

The second major DOS component, the code, allows you to load and save programs and read and write data files as part of BASIC programs. I'm not going to go into all the features of this part of the DOS. Instead, I will spend the rest of the article describing how the disk files work.

Files and Data

A file is a grouping of data stored outside the computer. It is composed of one or more individual groups of data called records. The easiest way to explain this is to give an example. Suppose that I am the secretary of a bowling league and want to maintain a scoring history for every bowler in the league. A file would be made up of

Continued on p. 46

TI DEALERS

**Anyone can ship you product
It's support that makes the difference**

 **Get the **

CompuTech Connection

*Product availability, same-day shipping, technical support,
co-op advertising, dealer newsletter, stock adjusting program.*

With CompuTech Distributing, one convenient toll-free phone call gets you instant access to our huge inventory of computer products for the Texas Instruments Home Computer. Plus over 1400 other TI-related items.

Try CompuTech Distributing—call our dealer service center to request your information-packed dealer kit today:
1-800-641-5000 (in Missouri 1-800-492-4500)

COMPUTECH DISTRIBUTING

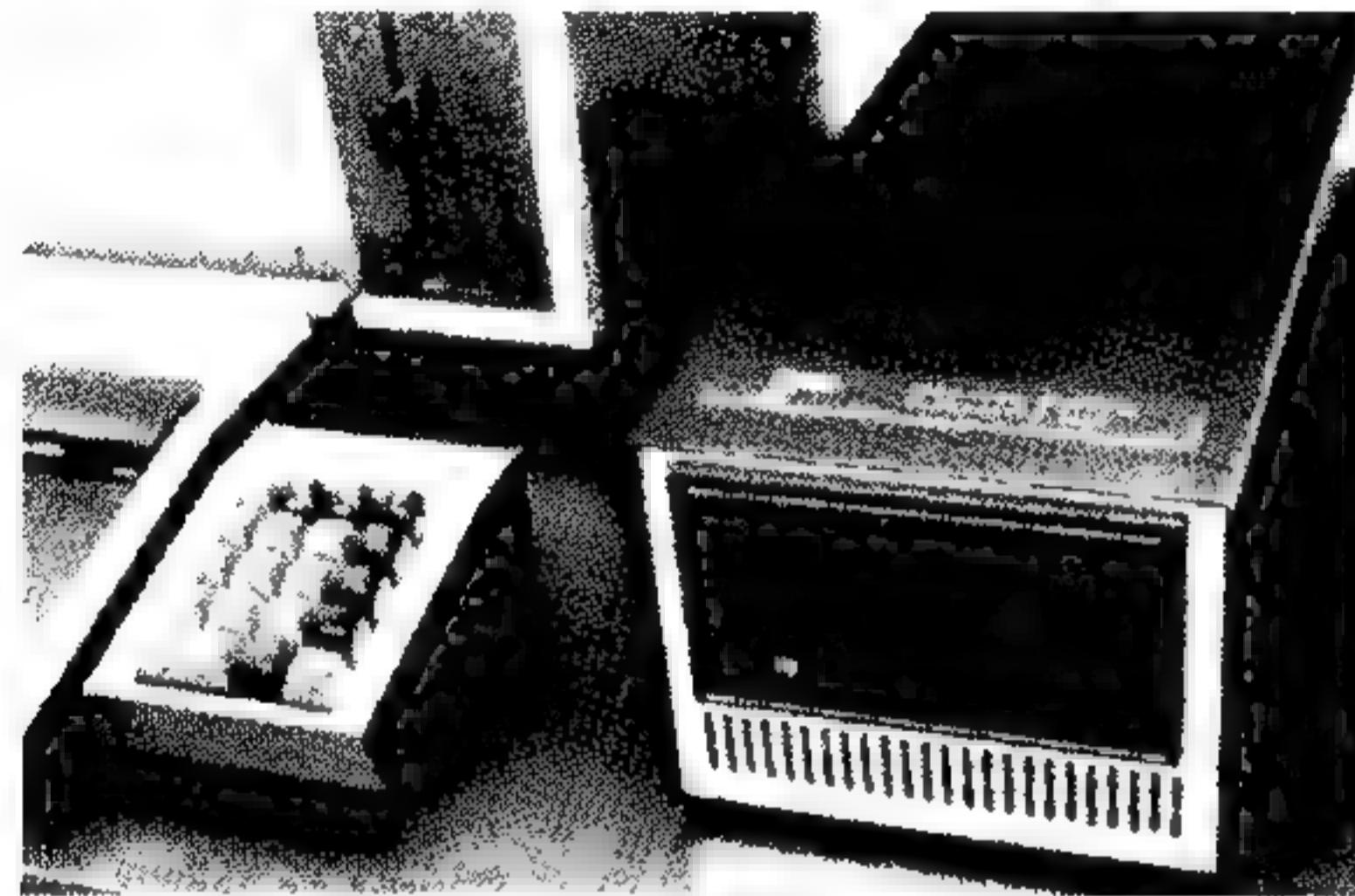
209 E. WALNUT SPRINGFIELD, MO 65805

1-800-641-5000 (In Missouri 1-800-492-4500)

NOW SHOWING

THE MYARC WINCHESTER DISK AND CONTROLLER SYSTEM

Available for TI-99/4A in 5 or 10 megabyte models



DEALER INQUIRIES INVITED

- Customized "directory" management
- Reliable back up
- Easy installation
- TI extended basic and assembly language support
- State of the art ecc
- Complete array of disk utilities

ALSO STARRING

Our CUSTOM DESIGNED *COMPU SOFT*
BUSINESS SOFTWARE

and

THE NUMERIC DATA ENTRY PAD
SPEEDKEY

It works Exclusively With *COMPU SOFT* Software

COMING ATTRACTIONS

- Accounts receivable!
- Word processing!
- Accounts payable!
- Agricultural!
- 1040 tax system!
- Mailing list!
- General ledger!
- Inventory!
- Order entry!

Dealer Inquiries Invited

Distributed Exclusively By

COMPUTECH DISTRIBUTING

209 E. WALNUT SPRINGFIELD, MO 65805

1-800-641-5000

(In Missouri 1-800-492-4500)



E-Z-DO-XBASE

Program Extended Basic with a fully prompted easy to use set of statements. No punctuation syntax required. Semi-completed listing. Full use of all colors. Eight user defined Sprites, and many more features. Program graphics, slow pace games and animations in your first hour of use. It's just great! 29.95 Value! Only 19.95

ASTEROID DEFENDER IN QUEST OF GOLD

Fantastic flight control of your drone in 3-D graphics with shadow effect. See how many GOLD bars you can bring home. With neat TI Voice and a gift program 14.95

SHOOTING GALLERY

An old classic in an electronic version with TI Voice and a gift program 14.95

POOR MAN'S PLOTTER

Line drawing and plotting with easy use of 48 predefined patterns. Requires 16K console and X Basic only. Only 14.95

COLOR BAR - DOT GENERATOR

TI or X Basic. Makes your computer a \$125 piece of test gear. ONLY 8.00 WITH ANY ABOVE PROGRAM 12.95

COMPUTERTRONICS

P.O. BOX 15823, Plantation, FL 33318

Send money order, cashier's check or check for da Residents add 5% Sales Tax. Cassette Only - Extended Basic. Games require Joysticks. Games play with or without Speech Synthesizer.

FROGG-O

MANEUVER THROUGH TRAFFIC AND ACROSS THE RIVER TO YOUR LILLY PADS. CATCH A BUG IF YOU CAN, BUT KEEP AN EYE ON THE CLOCK AND WATCH OUT FOR ALLIGATORS. MORE CHALLENGES AT EACH NEW LEVEL.

NOW AVAILABLE IN T.I. BASIC

KEYBOARD CONTROLLED, ALL YOU NEED IS YOUR T.I. 99 AND A CASSETTE RECORDER

TAPE ONLY — \$12.00

SEND CHECK OR MONEY ORDER TO

S&S SOFTWARE

117 ROSEBUD

WATERLOO, IA. 50701

IOWA RESIDENTS ADD 4% TAX

MICRONOVA presents the HOME COMPUTER DIRECTORY

Put the world of your TI 99/4(A) at your fingertips with this unique information resource handbook!! The Directory contains hundreds of useful contacts and source material on:

- ★ Over 100 Software Businesses
- ★ TI Hotlines and contacts
- ★ Sources of technical information
- ★ Business and Market news
- ★ Future trends and new offerings
- ★ Computer Advantage Clubs
- ★ Publications
- ★ Logo & CAI contacts
- ★ Multilevel Marketing scene
- ★ Users Groups
- ★ Learning to program
- ★ On-line databases
- ★ And much more!

Send \$4.95 check or money order to:

MICRONOVA 99
P.O. Box 1058
Northampton, MA 01061

Crime and Punishment

At last a socially responsible game!

Tired of shooting aliens? Like to use your computer to tackle real life problems? Then try CRIME AND PUNISHMENT.

■ You decide on punishments for murderers, robbers, embezzlers, burglars and many more—over 1,000 unique cases.

■ Your sentences are compared to those of actual trial court judges—collected from years of painstaking research.

■ Educational: Extensively documented—learn how to make wise decisions—find out what really happens in criminal trials.

■ Fun: Lots of TI graphics and sound. Find out your decision-making I.Q.!

TI BASIC - CASSETTE - \$16.00

Send check or money order to:

Decision-Making Systems Ltd.

P.O. Box 9557, Wilmington, DE. 19809.

Watch for **Search and Seizure** and others in our series of games with a conscience!

DON'T WAIT TOO LONG

To Experience The Excitement Of
Assembly Language

Discover what everyone has experienced when they have tried our Assembly Language Program. You will be amazed at the speed and power your 99/4 or 4A can produce from only a cassette and Mini Memory Module.

DEFEND THE CITIES II - An alien ship orbits overhead dropping bombs on the cities. You must destroy the bombs before they reach the skyline and you must destroy the ship to end the attack. Your ship rotates 360° enabling you to fire or accelerate in any direction. Spectacular arcade action graphics and sound effects.

This is a full 4K Assembly Language Program and requires either MMM, cassette and console or Editor/Assembler 32K disk system and console.

The kind of game you might pump quarters into all day at a commercial arcade

99er Magazine Nov 82

Cassette \$19.95 Disk \$21.95

DEFEND THE CITIES - Extended BASIC version. One of the better games being offered in the arcade category

99er Magazine Nov 82

Cassette \$19.95

Apple/Mastertronic Inc.

INTERSOFT

5407 Salem Rd.

Austin, Texas 78745

(512) 447-1757

Diskettes . . . from p. 43

records which hold information about each individual bowler. If there were 60 bowlers in the league, I would need 60 records in the one file. Each file has a name, and we will call this file *Bowlers*.

File data used in BASIC programs can be stored in either DISPLAY or INTERNAL format. DISPLAY stores data exactly the way it would look on a monitor or in DATA statements. All letters and numbers are stored as individual characters. In order for our program to perform operations with this data, the computer will first have to convert it to INTERNAL format. For this reason, we are better off saving all data in INTERNAL format to begin with. All numbers in INTERNAL format will take exactly 8 bytes no matter how large they are. This may help us estimate how big each record that holds the data will be. In all my programs, I use only INTERNAL format data.

Having made that decision, we tell the DOS in the OPEN statement what kind of file we are going to use and what option we'd like for processing the files. Depending on how we want to store and retrieve our records, we will tell the DOS to file our bowlers' information in either sequential or relative data files.

Sequential Data Files

These are individual records stored on the disk one after the other, in the same order in which they were written. For example, the first record in *Bowlers* would contain the data written to the disk for the first bowling league member; the second record written to the disk would contain the data of the second member, and so on.

These sequential files can be either fixed length or variable length record files. A fixed length record file is identical to the files stored on cassettes. Each record is the same length, which can be anywhere from 2 characters (bytes) to 255 characters (a full sector) long.

In a variable length file each record may have a different length up to a maximum amount. For example, suppose a part of each record in *Bowlers* was to contain the member's name. With fixed length records, we would have to make sure that we truncated any names that were too long to fit in the record. On the other hand, if someone's name were short (and therefore smaller than the fixed length), the DOS would have to pad the name part of the record with zero bytes so that it would be the right length. In a variable length file we would not have to worry about any of this. We would tell the DOS the maximum size that the variable length record would be and let the computer do the rest. Variable length records can be up to 254 characters long, which means that we can set the maximum length high enough to accommodate any name. This way, if a name is short, we do not waste disk space with padded information. Variable length records are very efficient at storing data strings, such as people's names. The only disadvantage is that variable length record files use up one byte per record, which makes the maximum length of a record 254 bytes.

The major drawback of a sequential file is that even though the file is located on a disk in a drive that can jump from track to track, it is often a case of "you can't get there from here." In this regard, it is just like a cassette tape file. Whenever data is read from this kind of file or written to it, the entire file (that is, all the records) in front of the one we want must be read or written. So it is not possible to go from record 242 to record 241. Instead, the system goes back to record 1 and reads all the way to 241. To read from a sequential fixed length file, we would OPEN the file in the INPUT mode. To write out to the file, we would OPEN it as OUTPUT.

Because the sequential variable length file is stored on a disk, there are some things we can do with it that are just not possible with cassette tape files. For exam-

Still think the 99/4 is a slow machine? One benchmark we ran took 3 minutes and 40 seconds in BASIC. It ran in 7 seconds in

FORTH

For the 99/4 and 99/4A. Extended Memory required. You also must have one of the following modules

Editor/Assembler, Minimemory or Extended Basic. Please state disk or cassette system, and the host module when ordering

Wycove Forth: \$40

Add \$10 for source code if desired

Wycove Systems Limited

P O Box 1105
Dartmouth, Nova Scotia
B2Y-4B8 Canada

WIRE WRAP PROTOTYPE BOARD PROTOTYPE KIT BUS EXTENDER CARD

SAT 4512 Wire Wrap Prototype Board

Supports as many as 48 20 pin devices plus regulators and associated capacitors, and is designed to be used with TI's peripheral expansion box. Varieties of 8, 14, 16, 18, 20, 24, 40 and 64 pin devices also can be installed.

\$48.50

SAT 4513 Prototype Kit

Contains 15 3-level wire wrap sockets; wire wrap D's + 5, ± 12 regulators and associated capacitors, 100 pins and 20 decoupling capacitors.

\$39.95

SAT 4511 Bus Extender

Used to facilitate check out/repair of cards used in the TI peripheral expansion box.

\$48.50

Coming Soon

MEMORY EXPANSION BOARD

SPACE AGE TECHNOLOGY INC.

P O Box 30 • 215 W. Garst • South Bend IN 46624

To Order Call: 1-800-348-5000
In Indiana Call 1-800-552-2277

Visa/MasterCard Accepted

No C O D

ple, we can tell the DOS that we want to add new records to a file and that we don't want to read in all the previous data first. In this case, we can OPEN the file in what is called APPEND mode so that we will automatically add new records to the back of the file. We cannot do this with cassette tape files!

The EOF function is another neat feature provided by TI's DOS for sequential files. This allows us to see if we have run out of data on a sequential file while we are reading it in. Trying to read past the last record on a file will generate an error. This means that we do not have to keep a special record count to make sure that we don't try to read in too many records.

Because the data on input is saved in the buffer, we can both read and write at the same time. We do this by OPENing the file in UPDATE Mode. Using this feature is very tricky because we cannot tell the DOS which record we want written out. If we have just read in the 15th record, changed its data and then want to write it to the disk, we have to be careful. Telling the DOS to write it out now won't cause the new data to write to the 15th record. For this reason, I'd never use this method.

Let's review what we know about sequential file processing. First, the file can be composed of either fixed length records or variable length records. Second, fixed length record files are just like cassette files except that they can be a maximum of 255 characters long. These files can be OPENed as either INPUT only or OUTPUT only. Variable length record files have a length of 254 bytes and can be OPENed as INPUT, OUTPUT or in APPEND mode. Third, using the EOF statement will protect you from reading past the last record on the file. Finally, you can try a tricky technique to both read and write a sequential file by OPENing it in UPDATE mode.

We will now go over an example of what the sequential disk file program code

would look like by recoding the bowling league program.

```

90 REM ROOM FOR 60 BOWLERS
  NAMES, AVERAGES, HANDI
  CAPS.
100 DIM B_NAME$(60), B_AVG(60),
    B_HANDI(60)
999 REM OPEN FOR OUTPUT
1000 OPEN #25: "DSK1.BOWLERS",
    OUTPUT, INTERNAL, SEQUEN
    TIAL, VARIABLE 254
1010 FOR I = 1 TO 60
1020 PRINT #25: B_NAMES(I); B_
    AVG(I); B_HANDI(I)
1030 NEXT I
1040 CLOSE #25
1099 REM OPEN FOR INPUT
1100 OPEN #20: "DSK1.BOWLERS",
    INPUT, INTERNAL, SEQUEN
    TIAL, VARIABLE 254
1110 I = 1
1120 INPUT #20: B_NAME$(I); B_
    AVE(I); B_HANDI(I)
1130 IF EOF(20) = 0 THEN 1140 ELSE
    1160
1140 I = I + 1
1150 GOTO 1120
1160 CLOSE #20

```

Statement 1100 opens the file called BOWLERS located on any disk found on drive 1 for input. Statement 1000 opens it for output. Since the file already exists on the drive, this new version will be written over the earlier version already on the disk. Note that by letting the DOS do the blocking, we have significantly decreased the amount of work we have to do on output (compared with what is required for tape files). Also notice that I use variable length records to minimize wasted disk space when a bowler has a short name. Another thing to notice is that on input, I use file #20 for BOWLERS, but for output I use file #25 for the very same file. I do this to emphasize that once a file has been CLOSED, you can reopen it with any available file number. The only rule to

Continued on p. 49

1

Source

For all your Third party independent Software at Discount Prices! Free Monthly Bulletin, Price quotes on full line of products for the TI computer. Plus ALL in stock orders shipped the same or next business day. Just Call or Write

Music Workshop

59 E. Tioga St
 Tunkhannock, PA 18657
 (717) 836-4522

Visa & Master Card Accepted
 Specials-Joystix Adapters-Allows use of
 Atari compatible units-\$14.95
 Wico-Red Ball controllers-\$27.95 ea.
 Add \$2.00 postage-6% Tax for PA residents

NOW AVAILABLE...

from MECA, Inc.
 A Music Program for the 99/4
 that's FUN TO USE and
 Really Works
 to improve Music Skills

Created by a University Music Professor
 For Beginning, Intermediate & Advanced Musicians

NOTE WHIZ

Extended Basic

\$29.95

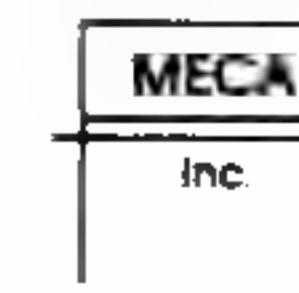
Cassette or Disk
 (specify)

Learn to Read Notes Quickly and Accurately
 • Four Clefs Included (Treble, Bass, Alto and Tenor)
 • Three Levels—Beginner to Advanced
 • Plays Like a Game!
 • Fast-paced/Scoring/Music/Rewards
 • Outstanding Color Graphics
 • Easy to Use
 • Built-in Rewards for Exceptional Scores
 • Record Keeping with any Printer
 • FREE INSTRUCTION BOOK
 (Copy protected to conceal special rewards.)

Add \$2.00 shipping and handling
 Virginia residents add 4% sales tax

Send check or money order to
 MECA, Inc.
 P.O. Box 5425
 Richmond, VA 23220

Other exciting Music products available! Write for details!



PRICE BREAKTHROUGH

Super Sale on New Disk Drives

Starting at \$199.95 complete
with Power Supply and Case!!

Tandon — Siemens — Remex — MPI — Teac
single sided 40 track — dual sided 40 track
single sided 80 track — dual sided 80 track

RADIO SHACK¹—HEATH/ZENITH²—APPLE³

IBM/PC⁴-TEXAS INSTRUMENTS⁵& MOST OTHER COMPUTERS

Drive a Hard Bargain!!™

**8 M.B. - 12M.B. with Power Supply Case, Cables & Software
Complete Systems from \$1,595.00**

Amazing Special - dual sided 40TK or 80TK drive with Power Supply and Case and Our Special Warranty - Starting at \$259.95

TOLL FREE ORDERING GENERAL AND TECHNICAL

Model III Internal Disk Drive Kits.....	\$Call
Color Computer Drives 0123.....	\$Call
Diskettes of all sizes (Box of 10).....	<i>starting at</i> \$20.00
Dot Matrix Printers.....	\$Call
Word Processing Printers.....	<i>starting at</i> \$899.95
Printer Buffers 8K to 512K.....	<i>starting at</i> \$143.95
Disk Drive Cases and Power Supplies...	<i>starting at</i> \$49.95
DOSPLUS - 3.4 -	\$Special Price

One Year Warranty Available on all Drives!

Dealer inquiries invited.

SOFTWARE SUPPORT, INC.

One Edgell Road, Framingham, MA 01701

(617) 872-9090

Hours: Mon. thru Fri 10 am to 6 pm (E.S.T.)

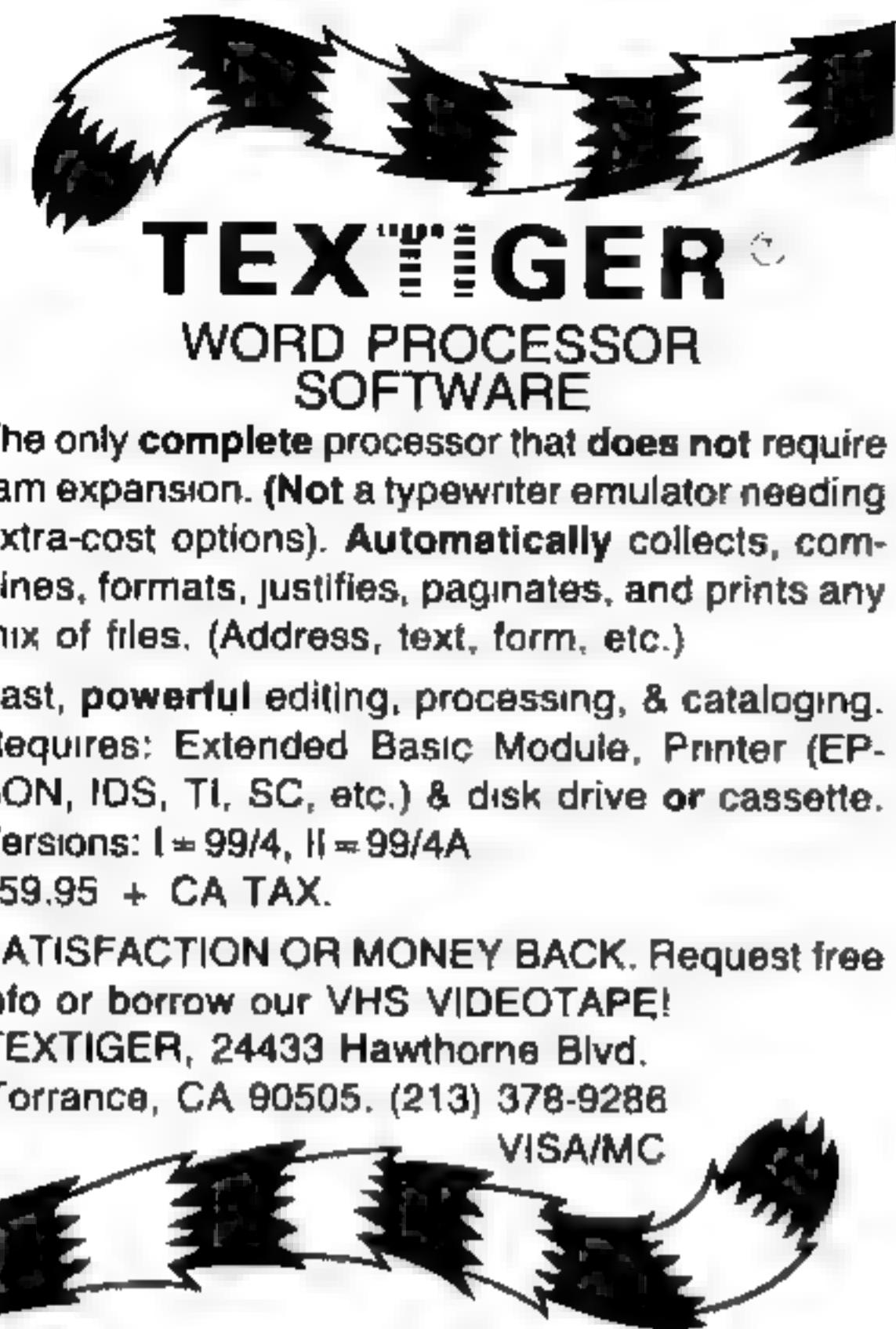
Sat. 10 am to 5

TERMS:

M.C./Visa/Amex and personal checks accepted at no extra charge. C.O.D., please add \$3.00. Shipping: Please call for amount.

DISK DRIVES DISK DRIVES DISK DRIVES DISK DRIVES DISK DRIVES

- 1 "TANDY CORPORATION
- 2 "ZENITH DATA SYSTEMS
- 3 "APPLE COMPUTER CORP.
- 4 "IBM CORPORATION
- 5 "TEXAS INSTRUMENTS



TEX TIGER
WORD PROCESSOR
SOFTWARE

The only complete processor that does not require ram expansion. (Not a typewriter emulator needing extra-cost options). Automatically collects, combines, formats, justifies, paginates, and prints any mix of files. (Address, text, form, etc.)

Fast, powerful editing, processing, & cataloging. Requires: Extended Basic Module, Printer (EPSON, IDS, TI, SC, etc.) & disk drive or cassette. Versions: I = 99/4, II = 99/4A
\$59.95 + CA TAX.

SATISFACTION OR MONEY BACK. Request free info or borrow our VHS VIDEOTAPE!

TEXTIGER, 24433 Hawthorne Blvd.
Torrance, CA 90505. (213) 378-9288
VISA/MC

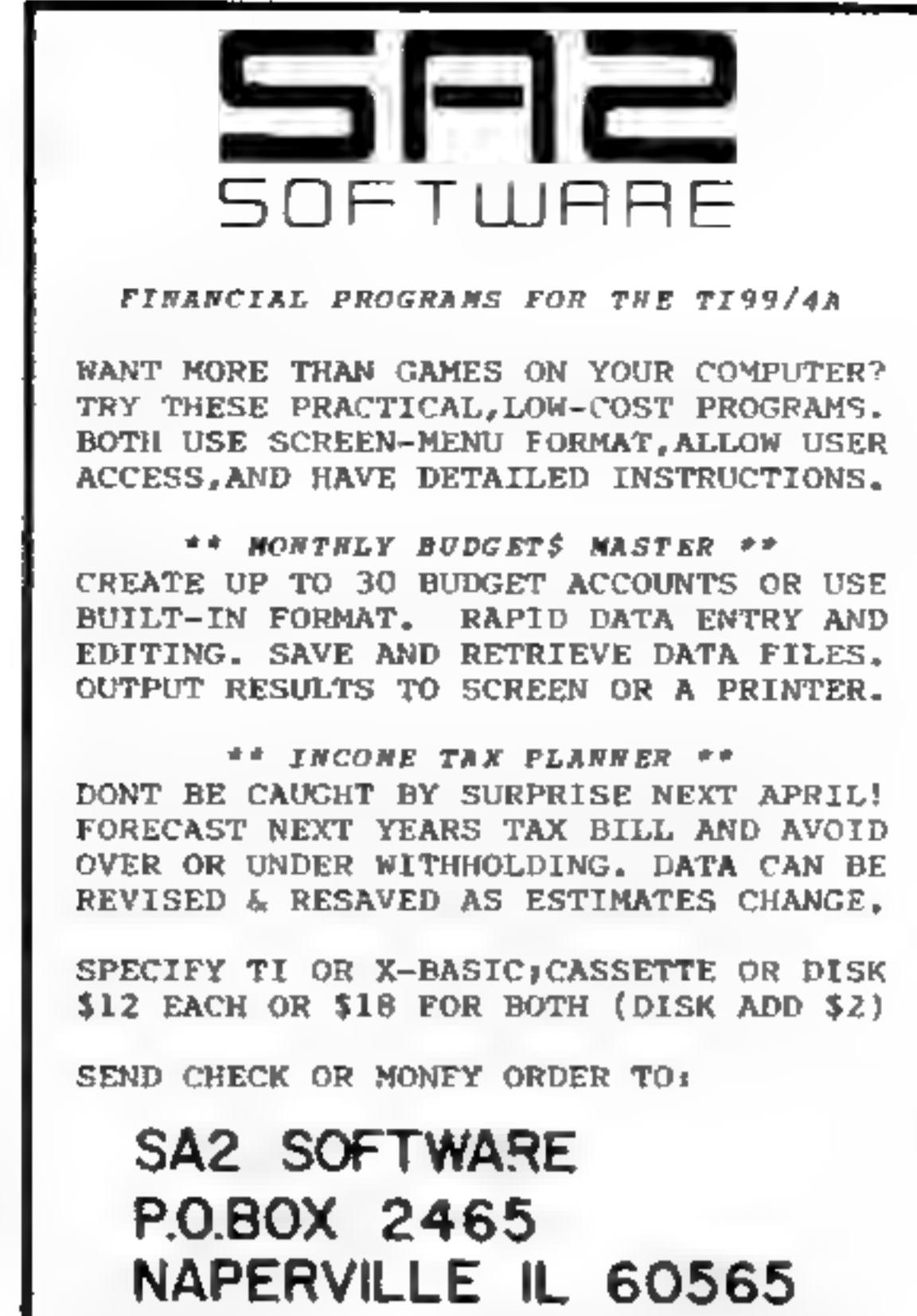
Diskettes . . . from p. 47

remember is that you can't use the same file number for two different files that are open at the same time!

Relative (Random) Data Files

One of the most powerful features of the DOS is its ability to handle the second kind of file that can be stored on a disk, the *relative* or *random* file. These files are composed of fixed length records which the DOS can locate directly. The DOS does not have to read past a previous record in order to get to the one we want. It can calculate the exact track, sector, and location within a sector merely by looking at the record number we want to retrieve. With this kind of file, the 15th record written out can be placed on the first record of the file, the 4th record written out can be placed on the 3rd record of the file, and so on. This kind of file processing is very useful when we want to update particular records in a very large file. We don't want to waste our time reading the data that doesn't change. For example, suppose that our bowling file contained data on 500 bowlers but only 30 of them bowl on a particular day. Why waste time reading in records on all 500 members when all we want to do is to update 30 records? You can see that this type of file can give us tremendous power.

Because the only limitation on relative record files is that they be fixed length, there is nothing to prevent us from creating this file sequentially in one program and updating it as a relative file in another! If we are just going to read the various records on the file, we can OPEN the file as INPUT. Similarly, if we are creating the file and are not going to be reading any records, we can OPEN it as OUTPUT. However, if we are going to be updating individual records, we indicate this to the DOS by OPENing the file in UPDATE mode. Every time we want to read or write a record, no matter how it was opened, we give the record number as part of the READ or PRINT statement. Without a



SA2
SOFTWARE

FINANCIAL PROGRAMS FOR THE TI99/4A

WANT MORE THAN GAMES ON YOUR COMPUTER? TRY THESE PRACTICAL, LOW-COST PROGRAMS. BOTH USE SCREEN-MENU FORMAT, ALLOW USER ACCESS, AND HAVE DETAILED INSTRUCTIONS.

** MONTHLY BUDGET\$ MASTER **
CREATE UP TO 30 BUDGET ACCOUNTS OR USE BUILT-IN FORMAT. RAPID DATA ENTRY AND EDITING. SAVE AND RETRIEVE DATA FILES. OUTPUT RESULTS TO SCREEN OR A PRINTER.

** INCOME TAX PLANNER **
DON'T BE CAUGHT BY SURPRISE NEXT APRIL! FORECAST NEXT YEAR'S TAX BILL AND AVOID OVER OR UNDER WITHHOLDING. DATA CAN BE REVISED & RESAVED AS ESTIMATES CHANGE.

SPECIFY TI OR X-BASIC, CASSETTE OR DISK \$12 EACH OR \$18 FOR BOTH (DISK ADD \$2)

SEND CHECK OR MONEY ORDER TO:

SA2 SOFTWARE
P.O.BOX 2465
NAPERVILLE IL 60565

record number, the DOS will get the next available record for reading or writing. Suppose that I last read in record 15 using the REC part of the read statement. If I follow that with a regular read (no REC included), my program will wind up reading record 16.

Let's review what we have discussed about relative record files. First, they must contain only fixed length records, and any fixed length record file can be treated as a relative file. Second, they can be OPENed for INPUT only, OUTPUT only, or in UPDATE mode. Third, in order to use any mode, we must give the record number as part of the READ or PRINT statement. Fourth, if we don't provide a record number, the next record in line will be read or written.

Suppose that we want to update our bowlers' pin averages after every frame. We first change our original example program to create a file using fixed length records only. For this example, let's make all records 250 bytes long. Then we give each bowler a number representing his record number; that is, the first bowler on our file has record number 1, the second has record number 2 and so on. We then write a program that would look something like this:

```

99 REM OPEN FOR UPDATE
100 OPEN #15;"DSK.BASIC01.
      BOWLERS",UPDATE,INTERNAL,RELATIVE,FIXED 250
200 REM MAINLINE
210 INPUT "ENTER BOWLER'S #":I
220 IF I<1 OR I>60 OR I<>INT(I)
      THEN 210
230 INPUT #15, REC I:B_NAME$;B_AVG$;B_HANDI
240 PRINT "ENTER NEW AVERAGE
      FOR ";B_NAME$
250 INPUT B_AVG
260 . . . . . [compute handicap here]
270 PRINT #15,REC I:B_NAME$;B_AVG;B_HANDI
280 GOTO 210

```

UNISOURCE

YOUR ONE SOURCE FOR 3RD PARTY SOFTWARE, PERIPHERALS AND ACCESSORIES

SOFTWARE—Hundreds of programs by many authors including:

American	North Hills
Chaffin	Norton
Data Systems	Not-Polyoptics
Extended	Oak Tree
Futura	Pewterware
Fantasy	Patio Pacific
Galactic	Program Design
Hall	Prof. Microware
Linear	P S
Micro-Ed	Pewterware
Microcomputer	Simulsoft
Morreale	and more!
Moonbeam	

PERIPHERALS & ACCESSORIES

—From 10MB Hard Disk Drives to dust covers . . . everything you might need for your TI Home Computer.

SAVINGS—Ask about our discount program that applies to everything we sell—no minimum order.

ORDER TODAY. We Ship Tomorrow* or We Pay the Freight on any items currently in production. *Next business day; Continental U.S. only.

For more information or to order,
call us on our toll free hotline:

1-800-858-4580

(in Texas call 1-806-745-8834)

or write us at

P.O. Box 64240,
Lubbock, TX 79464.

UNISOURCE ELECTRONICS, INC.

Continued on p. 51

Come Work & Play In A Unique Environment . . .

Follow the Oregon Trail to the Beautiful Willamette Valley

Join a Dynamic Team of Creative Individuals Who Thrive on Challenge and Cherish Their Quality of Life.

We are offering—

- Technical Writers/Editors
- Software Engineers
- Logic Designers
- Applications Programmers
- Advertising & Marketing Professionals

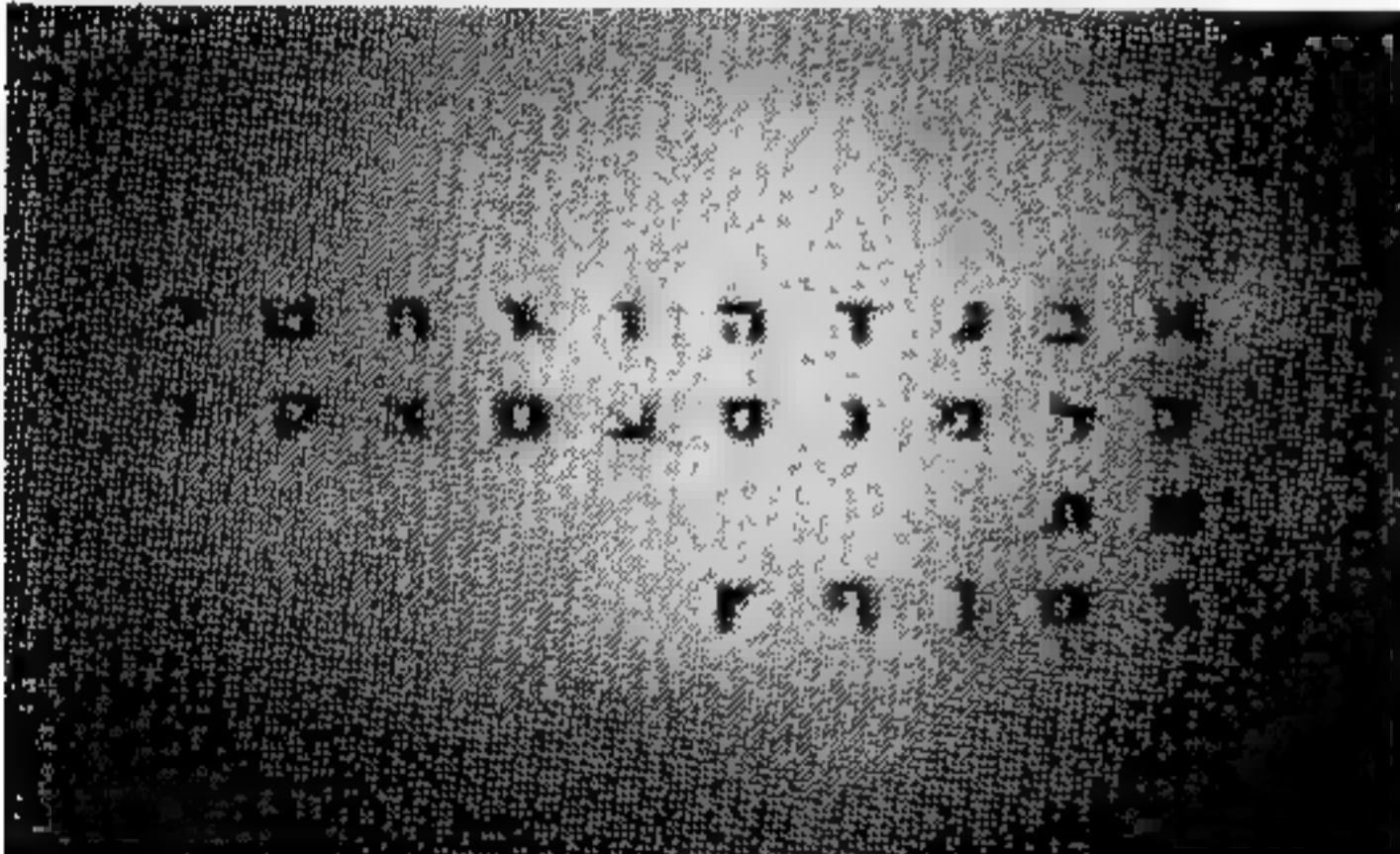
—The Opportunity of a Lifetime

Send your resume in strictest confidence to:

99'er Talent Hunt
Emerald Valley Publishing Co
1500 Valley River Drive, Suite 250
Eugene, Oregon 97401



Potpourri



Dear Potpourri Editor,

I am a beginning student of Hebrew. I decided to program my 99 4A to display "flash cards." My program includes a vocabulary of Hebrew words, phrases, and sentences, as well as their English translations.

One of the Hebrew items is selected randomly and displayed on the screen. Then I type in the English equivalent. If it's correct, the screen is erased and another flash card is presented. If my response is wrong, then the program displays the correct English translation beneath my own input line. In this case, I can study the display as long as I want to—another flash card won't appear until I signal that I'm ready by hitting a key.

Although the flash card idea is simple, the programming got a little tricky because Hebrew has different alphabetic characters than English and is written from right to left.

The next thing I want to do, which is even trickier, is to have the program display English while I respond in Hebrew.

Shalom,
Barbara E. Steinberg
Altadena, CA

99'er Hall of Fame



We are proud to induct the following gamesters into the 99'er Hall of Fame. Each of these June champions is under 18 years old! We are pleased to be able to send each of them one of our new Hall of Fame Certificates. Congratulations to:

Name: Charles J. Klein (Allentown, PA)
Game: Parsec
Score: 1,250,000

Name: Joel Morgan (Warner Robins, GA)
Game: Chisholm Trail
Score: 603,400

Name: Heidi L. Hinds, 15 (Ballwin, MO)
Game: Tombstone City
Score: 208,100

Name: Greg Ostrander, 8 (Kirkland, WA)
Game: TI Invaders
Score: 23,132

Name: Jeff Barna, 12 (Butler, NJ)
Game: Henhouse
Score: 64,840

Name: Brian Klamik, 6 (Riverside, IL)
Game: Car Wars
Score: 25,610

Name: Todd Miller, 13 (Racine, WI)
Game: Munchman
Score: 225,060

Name: David Sollohub, 7 (Plano, TX)
Game: Munchman
Score: 134,560

Want to Get Published?

99'er Home Computer Magazine is looking for articles in all areas of interest that concern Texas Instruments personal computers. Here are the kinds of articles that we want you to write for us:

- Are you a businessman, professional, hobbyist, scientist, or engineer with an interesting microcomputer application? Tell us how it works, what problems you've had to overcome, and what recommendations you have for others. We're especially interested in sharing user-written software with our readers.
- Have you recently purchased a piece of hardware or software that hasn't quite come up to your expectations, or has, on the other hand, impressed you with its performance? We're looking for comprehensive product and book reviews from different perspectives.
- Are you an educator or parent with something to contribute to computer-assisted instruction (CAI)? We're always looking for new ideas and fresh approaches to educational problems.
- Have you created any unusual computer games or simulations? Let our readers experience your excitement and pleasure.
- Perhaps you've modified your microcomputer or have interfaced it with some unique or useful hardware. Send us your how-to-do-it story.

These are just some ideas. Perhaps you have others. Don't worry if you're not a professional writer. Our editorial staff stands ready to help polish up your manuscripts. And we'll be more than happy to send you a copy of our author guidelines.

Please send your double-spaced typed manuscripts, plus disks or cassettes (recorded on both sides) if the article includes program material, to:

99'er Home Computer Magazine / Editorial Dept.

1500 Valley River Drive, Suite 250
Eugene, OR 97401

YOU'D BE AMAZED.

If you own a TI 99/4A, you're already geared for a business of your own. A business with virtually untapped potential... a business that will profit in direct proportion to the home and business computer boom... a business that will give you the freedom of working and succeeding on your own terms.

Scotch Marketing is the multi-level marketing plan for computer software and related products. Already, Scotch Marketing dealers in all 50 states are building businesses of their own with the help of a comprehensive marketing tool we call SSS - Scotch Success System.

All it takes to profitably make it on your own is the hardware you may already own... and the SSS Plan.

Scotch
MARKETING

AMAZE ME!!!

Send me the information on
Tomorrow's Opportunity Today...
The SSS Plan and You.
P.O. Box 1636 SSS Springfield, MO 65805

Name _____

Address _____

City: _____

State: _____ Zip: _____

Phone: () _____

99'er

Diskettes... from p. 49

999 CLOSE #15

We open a relative file called *Bowler* located on a disk called BASIC01, using the UPDATE mode. Then we ask for the bowler's record number. We edit this number to make sure that it is legal, and then in lines 230 and 270 we include the number as part of our READ and PRINT statements.

We have gone through a very broad discussion about disks, disk drives, and disk files. I hope you found it both interesting and instructive. I also hope that it will make you feel so confident about using disks that you'll want to join the drive for diskettes!

Tuning Fork... from p. 13

```

290 REM *FRETS*
300 CALL CHAR(92, "0000000FFFFE000000
")
310 REM *GUITAR LOGO*
320 CALL CHAR(144, "3C7EFFDFDEDEDFF
F")
330 CALL CHAR(145, "3C7EFFFF7F7FFFF
F")
340 CALL CHAR(146, "7E3C000000000000
0")
350 CALL CHAR(147, "7E3C000000000000
0")
360 CALL CHAR(148, "000000005555000
0")
370 CALL CHAR(149, "000000287878B2B0
0")
380 CALL CLEAR
390 PRINT TAB(7); "TUNE YOUR GUITAR
"
400 FOR I=1 TO 10
410 PRINT
420 NEXT I
430 CALL HCHAR(15, 20, 144)
440 CALL HCHAR(15, 21, 145)
450 CALL HCHAR(15, 22, 146)
460 CALL HCHAR(15, 23, 147)
470 CALL HCHAR(16, 20, 146)

```

Tuning Fork

```

480 CALL HCHAR(16, 21, 147)
490 FOR DELAY=1 TO 2500
500 NEXT DELAY
510 CALL CLEAR
520 FOR C=1 TO 16
530 CALL COLOR(C, 2, B)
540 NEXT C
550 PRINT "ENTER NUMBER OF STRING
TO HEAR CORRECT SOUND OF
PROPERLY TUNED STRING."
560 PRINT
570 PRINT "SOUND WILL REPEAT, ALLOW
ING YOU TO ADJUST YOUR GUITAR
'S TUNING."
580 PRINT
590 PRINT "PRESS @ TO END THE PROG
RAM."
600 PRINT
610 PRINT "1)E/FIRST STRING"
620 PRINT
630 PRINT "2)B/SECOND STRING"
640 PRINT
650 PRINT "3)G/THIRD STRING"
660 PRINT
670 PRINT "4)D/FOURTH STRING"
680 PRINT
690 PRINT "5)A/FIFTH STRING"
700 PRINT
710 PRINT "6)E/SIXTH STRING"
720 PRINT
730 INPUT "ENTER STRING NUMBER.": Y
740 IF Y=0 THEN 1660
750 ON Y GOTO 760, 870, 980, 1090, 120
0, 1310
760 CALL CLEAR
770 GOSUB 1420
780 CALL COLOR(1, 16, B)
790 FOR I=1 TO 20
800 CALL SOUND(1000, 1319, 3)
810 FOR DELAY=1 TO 500
820 NEXT DELAY
830 NEXT I
840 CALL CLEAR
850 CALL COLOR(1, 2, B)
860 GOTO 520
870 CALL CLEAR
880 GOSUB 1420
890 CALL COLOR(2, 16, B)
900 FOR I=1 TO 20
910 CALL SOUND(1000, 988, 3)
920 FOR DELAY=1 TO 500
930 NEXT DELAY
940 NEXT I
950 CALL CLEAR
960 CALL COLOR(2, 2, B)
970 GOTO 520
980 CALL CLEAR
990 GOSUB 1420
1000 CALL COLOR(13, 16, B)
1010 FOR I=1 TO 20
1020 CALL SOUND(1000, 587, 3)
1030 FOR DELAY=1 TO 500
1040 NEXT DELAY
1050 NEXT I
1060 CALL CLEAR
1070 CALL COLOR(13, 2, B)
1080 GOTO 520
1090 CALL CLEAR
1100 GOSUB 1420
1110 CALL COLOR(4, 16, B)
1120 FOR I=1 TO 20
1130 CALL SOUND(1000, 587, 3)
1140 FOR DELAY=1 TO 500
1150 NEXT DELAY
1160 NEXT I
1170 CALL CLEAR
1180 CALL COLOR(4, 2, B)
1190 GOTO 520
1200 CALL CLEAR
1210 GOSUB 1420
1220 CALL COLOR(5, 16, B)
1230 FOR I=1 TO 20
1240 CALL SOUND(1000, 440, 3)
1250 FOR DELAY=1 TO 500
1260 NEXT DELAY
1270 NEXT I
1280 CALL CLEAR
1290 CALL COLOR(5, 2, B)
1300 GOTO 520
1310 CALL CLEAR

```

Continued on p. 52

99'er
PLEASE DON'T FORGET TO
RETURN THE QUESTIONNAIRE
ON THE FRONT BIND-IN CARD.

Tuning Fork

```
1320 GOSUB 1420
1330 CALL COLOR(14,16,8)
1340 FDR I-1 TO 20
1350 CALL SOUND(1000,500,3)
1360 FOR DELAY=1 TO 500
1370 NEXT DELAY
1380 NEXT I
1390 CALL CLEAR
1400 CALL COLOR(14,2,8)
1410 GOTO 524
1420 CALL HCHAR(5,13,91,11)
1430 CALL HCHAR(6,13,92,11)
1440 CALL HCHAR(9,13,92,11)
1450 CALL HCHAR(12,13,92,11)
1460 CALL HCHAR(15,13,92,11)
1470 CALL HCHAR(18,13,92,11)
1480 CALL HCHAR(21,13,92,11)
1490 FDR C=1 TO 16
1500 CALL COLOR(0,2,8)
1510 NEXT C
1520 CALL COLOR(8,5,8)
1530 CALL VCHAR(4,23,33,20)
1540 CALL VCHAR(4,21,40,20)
1550 CALL VCHAR(4,19,128,20)
1560 CALL VCHAR(4,17,56,20)
1570 CALL VCHAR(4,15,64,20)
1580 CALL VCHAR(4,13,136,20)
1590 CALL HCHAR(1,16,144)
1600 CALL HCHAR(1,17,145)
1610 CALL HCHAR(1,18,148)
1620 CALL HCHAR(1,19,149)
1630 CALL HCHAR(2,16,146)
1640 CALL HCHAR(2,17,147)
1650 RETURN
1660 END
```



Eastbench Software Products

Quality software for the

TI-99/4 home computer

Now available, 18 programs in ASTRONOMY including these new titles: Lunar Coordinates, Lunar Phases, Position of Comet Halley, Comet Halley Ephemeris, Daylight, Planetary Orbital Elements, the Calendar Program and many many more. Only \$16.95 for cassette and listing.

FINANCIAL programs include Non-Profit Income & Expense Report (\$34.95), Personal Income & Expense Report (\$27.95), Financial Statement Analysis (\$34.95) & Home Budget II, III & IV [for BASIC, XBASIC, & XBASIC plus disk] at \$27.95

Available UTILITY programs include Automatic Filer at \$37.95 [disk], computerized Telephone Directory (\$24.95), DiskMaster [for cataloging your disks] \$17.95, Pretty Print [for formatting your program listings] \$17.95 & Talking Bartender (\$24.95 disk)

EDUCATION listings include Higher Math Made Simple [a package consisting of routines for functions, matrices and calculus], Blackjack Strategy [test your blackjack theories before getting to the table] \$21.95, Haiku Poetry Generator (\$9.00), The Doctor program (\$9.00) & a Short Story Writer (\$9.00)

Our FREE CATALOG lists numerous other programs for finance, mathematics, statistics & education

When ordering include \$2.50 for postage & handling

Eastbench Software Products

1290 Cliffside Drive
Logan, Utah 84321
(801) 753-1084

NORTHERN LIGHT SOFTWARE



KING TUT'S TOMB

3D color maze, 4 levels, hidden pitfalls, 7 full chambers, bonus coffins and TUT'S ghost *(K/J)

JELLYBEANS

Can you put your patch in the conveyor belt's holes and keep the jellybeans from falling? 100 variations. *(K)

TRI-LIGHT

Combo computer/board game, 2 - 4 players (including computer). 3 levels, includes gameboard and 49 pieces. *(K)

AND MANY OTHERS

cassettes \$14.95 each
diskettes \$19.95 each

*Console basic **Extended basic
(K) Keyboard (J) Joystick
money orders or
certified cheques preferred

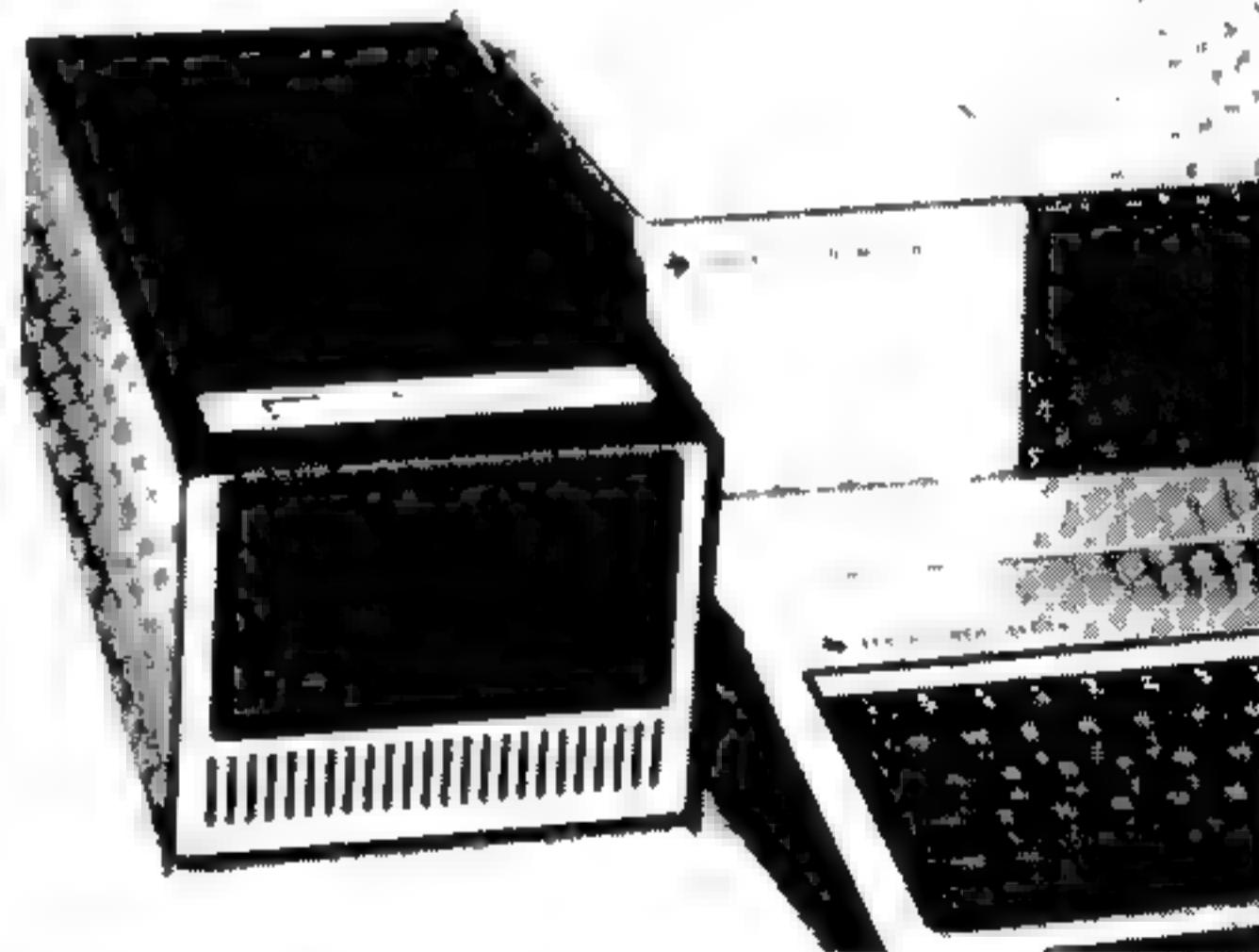
NORTHERN LIGHT SOFTWARE
P.O. BOX 11982
EDMONTON, ALBERTA
CANADA T5J 3L1

RELIABLE MASS STORAGE FOR THE TI99/4?

YOU BET!!

Field tested, MYARC's Winchester Disk and Controller System, the WDS/100 is custom engineered for reliability, ease of use and total upward compatibility from your floppy disk system. UNIX*-like file management is built into its Disk Operating System to accommodate the simplest to the most complex file processing requirements. Start up diagnostics, state-of-the-art error correction coding and rigorous factory burn-in ensure data integrity and hardware reliability. Sealed disk drive eliminates costly preventative maintenance. TURN YOUR 99/4 INTO A TRUE DATA STORAGE SYSTEM!

*UNIX is a trademark of Bell Laboratories



MYARC's Winchester Disk For The 99/4

\$2599 — 5-Megabyte Model

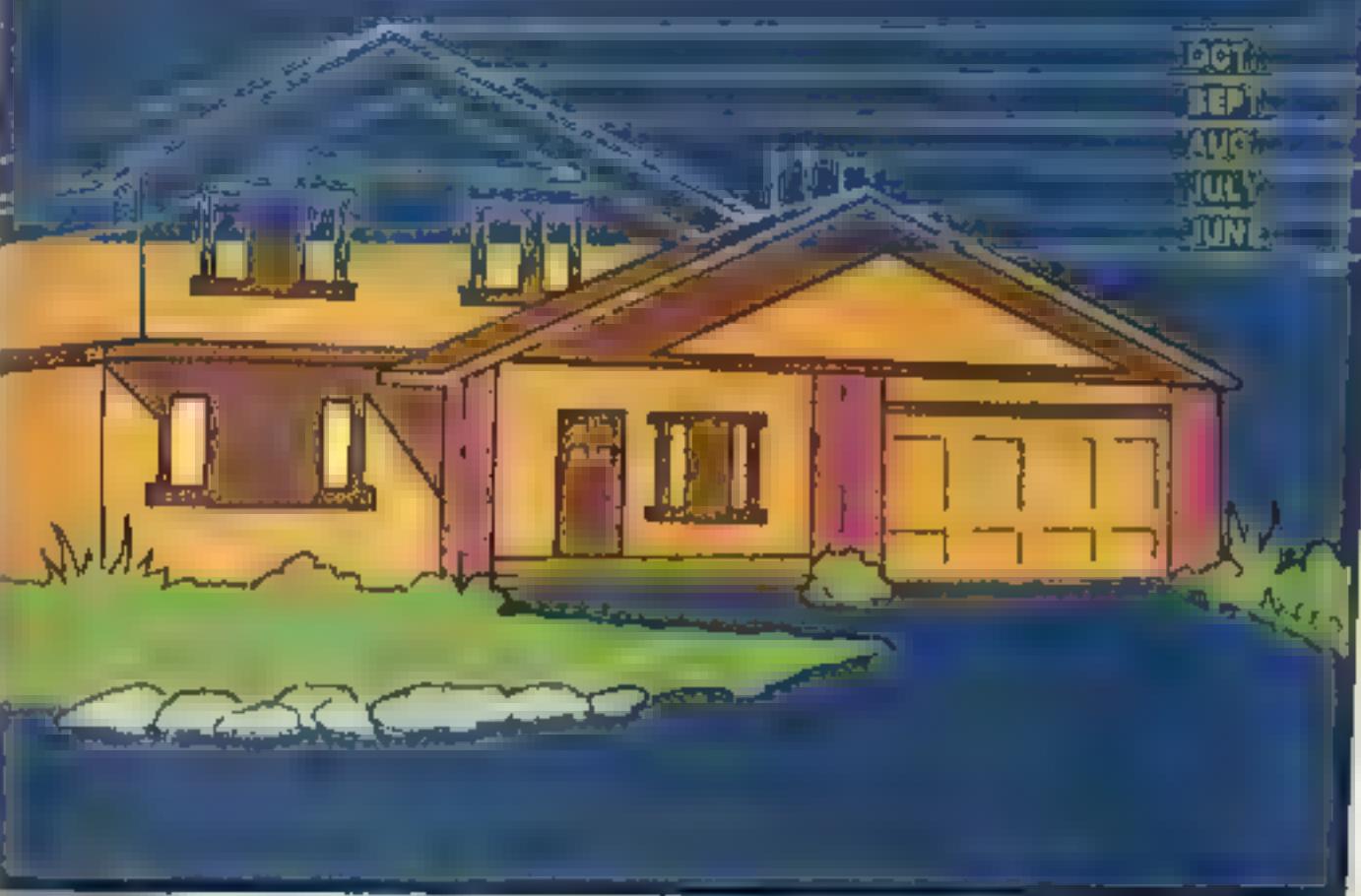
\$2999 — 10-Megabyte Model

CLOCK OPTION AVAILABLE

AVAILABLE NOW

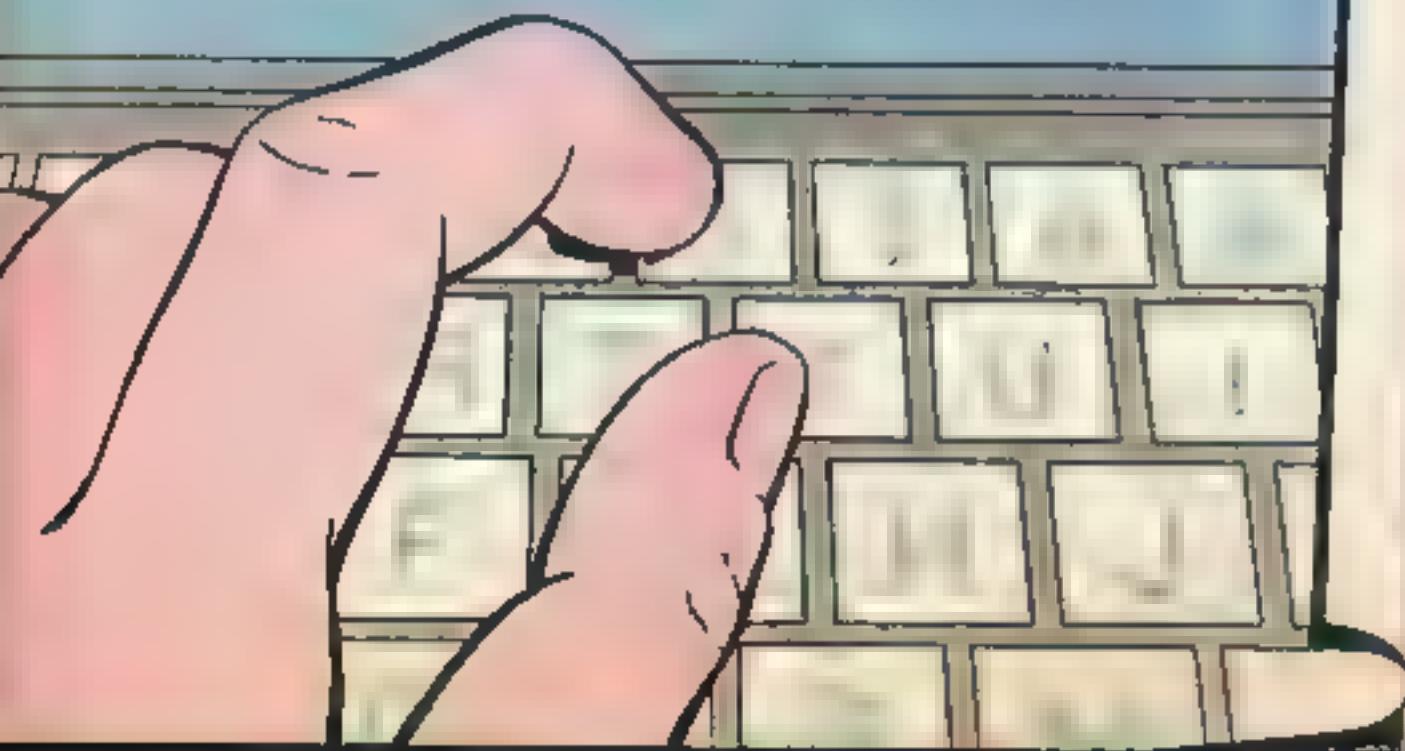
MYARC, INC.
P.O. Box 140
Basking Ridge, N.J. 07920
(201) 766-1700

PORTABLE COMPUTING



COMPACT COMPUTER 40

AMORTIZATION SCHEDULE



Touring Compact Computer Country Part III

LOOKIN' for a HOME

By David G. Brader

Curbside Manor

the 19th century, the first half of which was
marked by the growth of the steamship and
the development of the Suez Canal. The
second half of the century was marked by
the growth of the automobile and the
development of the airplane. The third half
of the century is marked by the growth of
the computer and the development of the
Internet.

SAVE

SOUTHERN AUDIO VIDEO ELECTRONICS, INC.

1782 Marietta Blvd., N.W., Atlanta, Georgia 30318

Royal Alpha Interface 2001A Daisy Wheel Printer* — \$495.00



*With port to interface with TI 99/4A.

Five print types available; 100 character keyboard (46 keys) with all keys electronically repeatable; automatic carriage return and line spacing; one touch tab clearance; page end indicator on paper support, plus many other features.

Maxell. Mini Disks. 5 1/4".

MD-2D Double sided, double density. For use on TI, Shugart or equivalent (10 pk.)	..... \$47.50
MD-1 Single sided, single density for mini floppy disc drives (10 pk.)	..... \$33.50

Panasonic Color Monitor—CT 160—\$295.00.

- Composite dual mode 10"
- Full color display for graphics and video games
- Clean monochrome display with flick of switch for data display

Panasonic TR120—\$174.00.

- High resolution monochrome 12" monitor
- High resolution green P31 phosphor providing optimum character display
- Produces 80 x 25 characters
- Built-in audio system
- Monitor cables available \$15.00.

Signalman Mark III Modem—\$89.95.

Direct connect telephone modem for TI 99/4 & 99/4A works with Bell modular phones only.

SA450 Doublesided, double density Mini Floppy—\$329.00.

Compact, single and double density capability 250/500 Byte (unformatted) storage. Shugart's 400 & 450 features: Low heat dissipation • DC drive motors • Positive media insertion • Write, protect circuitry • Activity light

Get the best prices on hardware and software. For a complete listing of all SAVE's products, send \$5.00 for our catalogue (refundable with your first order).

Enjoy the convenience of in-home shopping. Call our toll free number today for orders only.

Use your American Express, VISA, Mastercard, check or money order. Minimum order of \$50. Shipping and handling charges are extra. All prices are subject to change without notice. Allow 2-4 weeks for delivery. Prices good through July 15, 1983.

**Order Toll Free 1-800-241-2682
In Georgia (404)-351-8459**

9-9-6B

ment displayed, so you press the [ENTER] key, and the final payment display at \$1287.82 appears. Press [ENTER] again and the program asks SHOW SCHEDULE FROM PERIOD? (to which you enter 1), and TO PERIOD? (you enter 12 to see the first year). After watching the schedule roll by, you realize that almost \$15,000 would be spent on interest that first year. What a great write off!

Maybe you can find a bargain. How about heading over to the other side of town? Perhaps here you find an older home that needs a bit of TLC but is priced at only \$52,000. And the FHA mortgage can be assumed at 9.5%. Quickly, you grab the CC 40 from the back seat. Turning on the power (blessing the TI Constant Memory feature), you enter RUN. A few keystrokes reveal, via the Liquid Crystal Display, that your periodic payment will be \$437.24. Maybe you should take a closer look and see if you can fall in love with this one.

28 BASIC Lines

Although quite short, this Amortization Schedule program demonstrates many of the powerful features that are so useful in TI Enhanced BASIC. In the very first line we find something worth mentioning—the PAUSE statement. You will find that you frequently use this feature when displaying anything on the one line LCD. PAUSE may be used in two modes: first, to specify a (timed) delay between statements, and second, to delay a statement indefinitely until the operator presses the [ENTER] key. Notice that the first line (and several others in the program) is made up of several statements. In Enhanced BASIC, the statements are separated by a single colon.

The INPUT statement can output a separate prompt message for each input required. Each input prompt is separated from its variable list by a semicolon. Similarly, every input prompt and variable list is separated from the others by commas (see lines 110 and 200) so that individual input prompts and variable entries are started on a clear display.

The PRINT statements, as used in this program, could just as well have been DISPLAY statements. The choice was arbitrary. The DISPLAY statement in Enhanced BASIC is as powerful as the one in Extended BASIC on the Home Computer.

As with Extended BASIC, PRINT is used primarily for external output to devices such as the 4-color printer and other Hexbus peripherals. DISPLAY sends output exclusively to the built-in LCD.

The USING clause is illustrated in this program in conjunction with both the IMAGE statement and the quoted strings that are part of the PRINT statement. Line 280 demonstrates the former and line 180 is an example of the latter.

The IF construct in line 220 shows the power available for programming logical sequences. Not only does it feature an ELSE clause, but it allows multiple conditional statements to be included after the THEN and/or ELSE. As a result, the program-

DON'T LET ANYONE GIVE YOU A BUM STEER

When It Comes
To Selling Your Software . . .

We Pay Top Dollar
For Quality Entertainment & Educational
Assembly Language Programs

Contact:
Acquisitions Manager
99'er-ware
1500 Valley River Drive, Suite 250
Eugene, OR 97401



mer spends less time and effort debugging the program and more time putting it to use.

The Water's Fine

The best way to learn about your new CC-40 and how to program it is to jump in and start using it. By the simple act of keying in the *Amortization Schedule* program included here, you will probably begin discovering and learning. You will start to wonder why something was done a certain way and think of other things you would like the program to do. Before long, you will find yourself trying simple modifications to the program. And that is when the real fun starts.

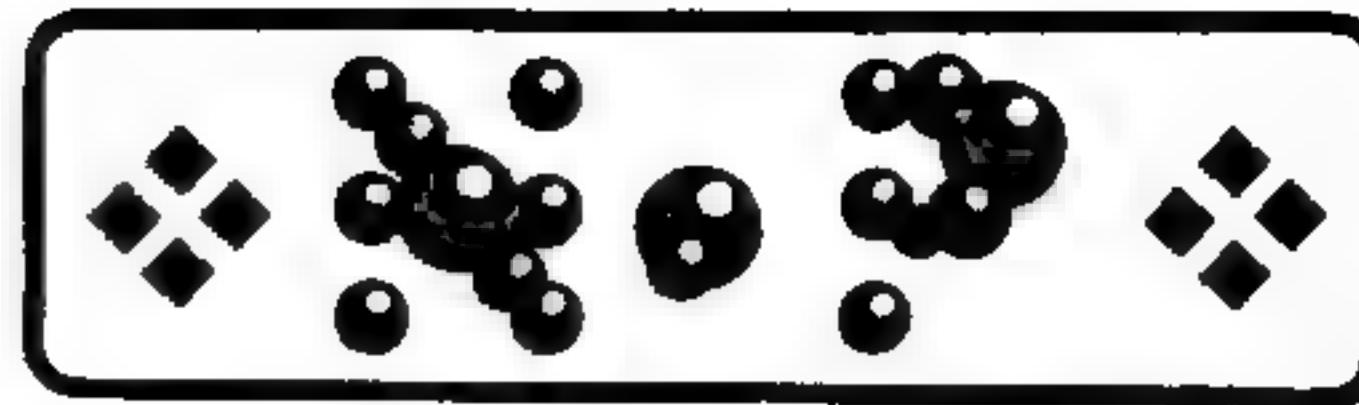
Amortization Schedule Explanation of the Program

Line Nos.	
100	Program title display.
110-120	Input the loan parameters.
130-170	Perform calculations for total loan value, periodic and last payments.
180-190	Display periodic and last payments.
200	Input the first and last periods for which a schedule will be calculated.
210	Current loan value L is calculated prior to loop.
220	If the last period for this schedule is the last payment of the contract, set $FLG=1$ for special handling of the last schedule entry.
230-310	The loop to output all but possibly the very last schedule entry.
240	Calculates the current balance.
250	Displays the schedule period number.
260	Current interest and principal are calculated, and the balance is saved for the next round as the variable L .
270	IMAGE statement for use in lines 180 and 350.
280	Output the interest and principal to the display.
290	IMAGE statement for use in line 300 and line 360.
300	Output the current loan balance to the display.
310	End of loop.
320	If $FLG=0$, end the program.
330-370	Output the special case information for the final payment.

```

100 DISPLAY BEEP,"AMORTIZATION SCHEDULE":PAUSE 1
110 INPUT "LOAN AMOUNT? ";LOAN,"NO. OF MONTHLY
    PAYMENTS? ";N
120 INPUT "ANNUAL INTEREST RATE %? ";IN
130 IN=IN/1200
140 PMT=LOAN*(IN/(1-(1+IN)^(-N)))
150 TOT=INT(PMT*N*100)/100
160 PAY=INT(PMT*100)/100
170 LASTP=TOT-PAY*(N-1)
180 PRINT USING"PERIODIC PAYMENT: $####.##";PAY;
    PAUSE
190 PRINT USING"FINAL PAYMENT = $####.##";LASTP:PAUSE
200 INPUT "SHOW SCHEDULE FROM PERIOD? ";STRT,"TO
    PERIOD? ";STP
210 K=(1+IN)^(-(STRT-1)):L=1/K*(PMT*(K-1)/IN+LOAN)
220 IF STP=N THEN FLG=1:STP=N-1 ELSE FLG=0
230 FOR Z=STRT TO STP
240 K=(1+IN)^(-Z):BAL=1/K*(PMT*(K-1)/IN+LOAN)
250 DISPLAY BEEP,"PERIOD ";Z:PAUSE 1
260 I=BAL-L+PAY:L=BAL:PR=PAY-I
270 IMAGE INT=$####.## PRIN=$####.##
280 PRINT USING 270,I,PR:PAUSE
290 IMAGE BALANCE = $#####.##
300 PRINT USING 290,BAL:PAUSE
310 NEXT Z
320 IF FLG=0 THEN END
330 DISPLAY BEEP,"PERIOD ";N:PAUSE 1
340 I=LASTP-BAL:PR=BAL:BAL=0
350 PRINT USING 270,I,PR:PAUSE
360 PRINT USING 290,BAL:PAUSE
370 END

```



On Sale from NOT FOR VCP
The 99/4(A) Program People

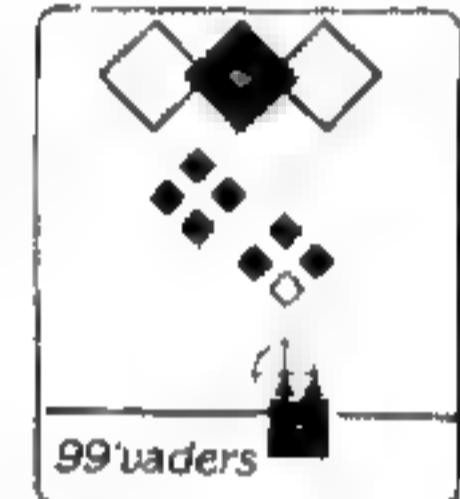
Five New Games for the 99/4(A)

In TI Console Basic -

Treasure Trap An exciting new concept in graphic adventure. Break into the Builders' Planetoid and explore myriad rooms on your quest for High Tech treasure. A different adventure each time you play!

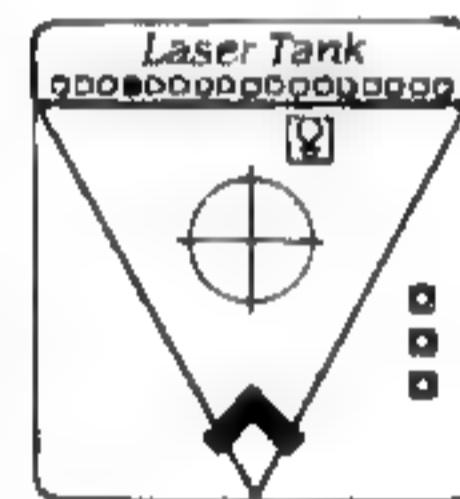


99'aders All the finger-slammimg adrenalin of the arcade favorite at half the cost. Fight back wave after wave of galactic kamikaze aliens from the last outpost on Earth



In TI Extended Basic -

Laser Tank On a battlefield of the future maneuver your Cotent Infra-red Equipped Vehicle (CIREV) into position for the lightning quick laser duels with similarly equipped enemy tanks. Chase and engage in the battle zone.



Waldoball Androids are pitted against Robots in this soccer game of tomorrow. Combines the action of team sport with the machine cool of pinball.



Arcade Monopoly Play this all time favorite with full graphic representation on your screen. Choose between regular and arcade versions. The arcade game adds quick movement, rolling obstacles, and the ability to blitz opponents' properties with super projectiles.

And don't forget the games that made 99/4(A) THE: Great strategic games such as Khe Sanh, Sengoku Jidai, Ant Wars, Ships!, and Hordes. Great action games like Tickworld, Maze of Ariel, and Cars & Carcasses 2. Great board games like Advance and Crosses. And of course the best selling Winging It flight simulator and Starship Pegasus game of CETI.

A New Peripheral that will change how you interact with your computer!

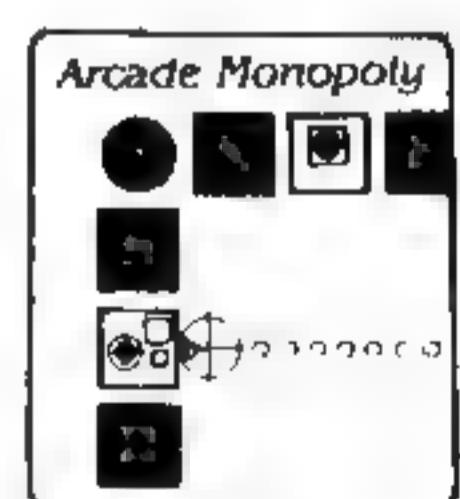
The Texas Light Shooter A photoreceptor gun that plugs into the joystick port of your 99/4(A) to allow you to shoot at targets on the screen. Included with the Light Shooter are complete instructions and a shooting spree game on cassette. Our supply will be limited initially so hurry ordering this item.

NOT FOR VCP
13721 LYNN STREET, SUITE 15
WOODBRIDGE, VIRGINIA 22191
(703) 491-5543

NAME _____
ADDRESS _____

\$18.00
Starship Pegasus Khe Sanh Sengoku Jidai Hordes Ant Wars
\$15.00
 Laser Tank 99'aders Arcade Monopoly Ships! Winging It
\$13.00
 Treasure Trap Waldoball Maze of Ariel Tickworld Advance
\$10.00
 Crosses Cars & Carcasses 2
 Texas Light Gun \$30.00

10% discount on orders of \$20 or more. Total of Order
Virginia Residents add 4% sales tax
\$1.00 Shipping for Light Gun.
©1983 by Ad-Polyplex.



WE CHALLENGE YOU TO COMPARE —

Try To Find Any Other Home Computer
That Gives You More For Your Money
Than Texas Instruments . . .

... Or Any Other Magazine
That Helps You Benefit More
From a Home Computer Than



There Are None!

THAT'S WHY THE EXPERTS SAY

**Once You Compare —
There's No Comparison™**

SATISFACTION GUARANTEED

Or the Unfilled Portion of Your Subscription
Will Be Refunded

YES—Please sign me up as a subscriber. Enclosed
is payment or credit card billing information.

Per Year	Sub A	Period A	Period B	Period C	For 99'er
1 yr. 2 issues	\$25	\$32	\$43	Inquire	
2 yr. 24 issues	\$45	\$52			
3 yr. 36 issues	\$63	\$70	Sample Issue	\$1.95	

Check or Money Order enclosed
IN U.S. FUNDS ONLY. DRAWER #1000 BANK

Name

PLEASE

Address

PRINT

City

State

Zip

Bill my: VISA Master Card

► Expiration Date

Signature

Charge Card Number

Please Mail
Your Order To: ► 99'er Home Computer Magazine
P O Box 5537
Eugene, OR 97405

Credit card phone order call

Tel. (503) 485-8796

Business Hours 4:00 AM - 5:00 PM

WEST
COAST
TIME

Finding the best deal in a Home Computer isn't the whole story. You also need a timely information resource to help you get the maximum value out of your purchase. And that's where 99'er Home Computer Magazine fits in.

As the ONLY magazine exclusively for the Texas Instruments brand of home, desktop and portable computers—including the versatile 16-bit TI 99/4A Home Computer, the TI-99/2 Basic Computer and the battery-powered Compact Computer—99'er Home Computer Magazine is a MUST for all current users interested in entertainment, education, business, professional, and home applications. Also, it is an essential educational resource for those who want to know more about the family of 100+ TI home computers and/or learn about the latest developments in computer assisted learning.

A Unique Combination of Resources

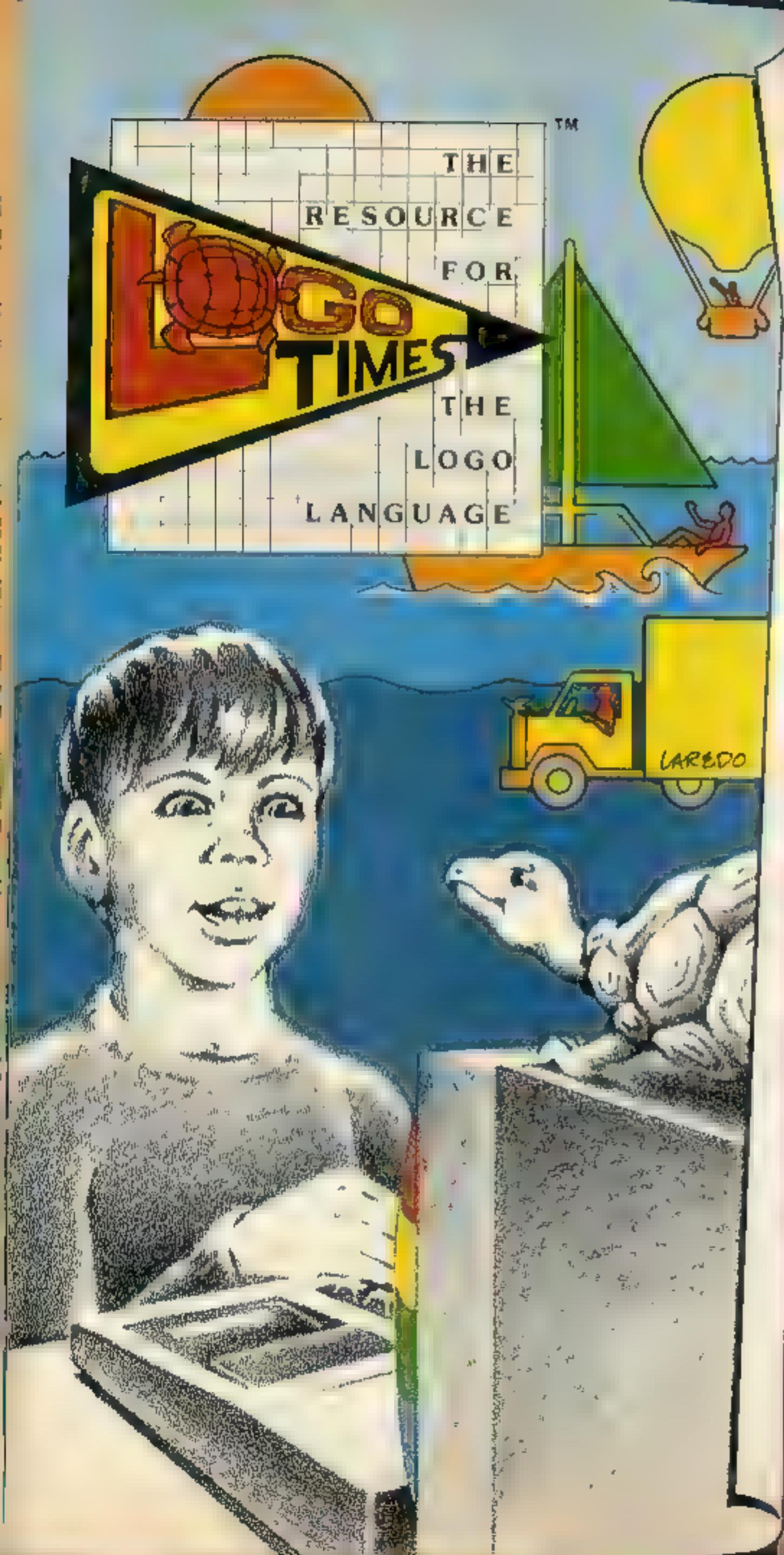
As a bonus, 99'er Home Computer Magazine contains several special interest sections: LOGO Times—a journey of applied imagination, exploration, and self-discovery using the TI LOGO language environment; Computer Gaming—a treasure trove of fun, enjoyment, and strategy; Portable Computing—an applications compendium for the portable computer user; and PLATO Progress—a valuable user's guide to the latest computer assisted learning library.

A Multi Level Teacher, News Medium, & Buyer's Guide With Lots of FREE Software

Each BIG monthly issue of 99'er Home Computer Magazine contains tutorials and applications for beginners, tips and "How To" articles for intermediate level users, advanced programming techniques that keep the pros coming back for more, as well as half a dozen ready-to-run computer programs for EVERYONE. Additionally, there are photos, news items from shows where TI exhibits, advertisements from the leading producers and vendors of TI and TI-compatible software, hardware and accessories, in-depth descriptions and reviews of the latest products and tools. All this information keep readers well informed and help them make wise purchase decisions.



From The People Who Know The Home Computer Best



Our Pal, LOGO TURTLE

By Reva Hunter

1308 Valencia Ave.
Laredo, TX 78041

It's Monday morning and my third-grade students are beginning to assemble in our self-contained classroom. Happy chatter fills the room as boys and girls hang up coats, unpack backpacks and begin turned games of Battleship or checkers before the morning bell signals the start of another school day. The room looks like many classrooms throughout America—tables arranged in squares and regular grids, a listening post, a science and math center, a reading center and a spelling center. Books and educational games are stacked on low shelves within easy reach of the students.

Suddenly, an excited boy runs to my arms and says, "There's a message today!" His delight is obvious as he points to the stand at the front of the room. On the stand is a letter from our old friend, LOGO Turtle. LOGO Turtle has been writing to us since the end of September. Once a week (usually Monday morning) he greets the boys and girls with a cheery, "Hi Pals," and an invitation to try something new on our TI computer. The students look forward to both his messages and their turns at the computer.

Center of Attention

The computer is another "center" in our room. Every student gets a turn at the computer in the weekly rotation of centers. The students await their 20-30 minute turns with happy anticipation. Never do they ask to be "delayed" or "dealt" from their turns; in fact, eager students often ask if there will be enough time before lunch for them to get an extra turn.

LOGO Turtle's message each week encourages the students to try something new on the computer. From his first message, he has asked the students to try new commands and procedures. They have learned that LOGO shares many of the words of their world, and that he will patiently learn words that they want to teach him. Telling their turtle friend to go forward, right, left, and back has led many students into a math lesson without their being aware of it. It is not uncommon to hear students stating the number of degrees in a circle or asking whether 90 degrees will send the turtle to the west or to the east. How many sides does a square have? How many 90 degree turns? Can I make a circle by small steps forward and small turns to the left or right?



Introduction

LOGO Times is an information resource for anyone interested in participating in the creation of their own personal language—one that will easily allow them to communicate with a computer in a totally new audiovisual realm of applied imagination, exploration, and self-discovery. The articles on these pages concern the use of the new LOGO language, but you do not need any additional software or equipment (or even a computer) to understand and learn from the material presented here.

If readers want to actually experience the TI LOGO environment, they will need either a TI99/4 or TI99/4A computer, the Expansion Memory peripheral, and TI LOGO Command Cartridge. A disk drive, although convenient to have, is not required; a user's work may alternately be saved on cassette tape, printed out on the TI Thermal Printer, or hand copied into a notebook (for later re-keyboarding).

In each issue, one or more of the articles may reference or build upon the topics discussed in a previous article. It is therefore recommended that for maximum benefit and understanding, new readers obtain the appropriate back issues of 99'er Home Computer Magazine containing LOGO Times articles.

NOTICE

LOGO Times is actively soliciting articles. Manuscripts should be typed double-spaced, and accompanied by a cassette tape or disk if containing any lengthy procedures or graphics.

Send all materials to:

LOGO Times, Editorial Dept.
99'er Home Computer Magazine
1500 Valley River Dr., Suite 250
Eugene, OR 97401

All mail directed to the letters to the Editor column (Letters to LOGO) will be published in accordance with the conditions set forth on 99'er Home Computer Magazine's masthead page.

Our Contributing Editors

Henry Gorman
 Department of Psychology
 Austin College
 Box 1584
 Sherman, TX 75090

Roger B. Kirchner
 Department of Mathematics
 Carleton College
 Northfield, MN 55057

LOGO Times is a trademark of Emerald Valley Publishing Co.

The LOGO Motive

It's always interesting to watch students encounter the computer. Some charge in with boundless enthusiasm, touching keys and asking questions at the same time, going back to change words just typed, talking, exploring, and then reflecting. Others sit back, ask a shy question, timidly try, then ask, "Can I... Will he... What if...?" It is with these students that LOGO Turtle is at his best. He waits patiently. There are no bells or buzzers urging quick responses. He waits. If a student types in a message that he can't execute, he doesn't hesitate or stop. He says, "Tell me more" or "Tell me how to..." The students are delighted. They have ideas of their own that they want to try. When LOGO Turtle does what they command, they are thrilled. When he doesn't do what they thought he would, they rethink, replan, and try again.

Computer work need not be a solitary activity. We have two older students Kevin Lake, a fourth grader, and Roger Byler, a fifth grader—who come into our classroom each day to help the third graders at the computer. They have devoted an hour or two after school each day to staying a step or two ahead of our class in LOGO expertise. They pass this knowledge on to their students. The program VACATION arose out of their LOGO experimentation. The procedures for PARK, ROAD, BEACH, LAKE and GRASS came from their exploration of the TELL TILE command. They used the sprite mode to create BALLOON, CAR, TRAFFIC, TREE, and BOAT. Their desire to make an animated picture led to the development of SAIL and JOG, as well as the movement of the balloon, car and truck. Both boys smiled with delight the day they perfected their procedure for making their people jog with animated arm and leg movements.

Each day as the boys set to work new questions arose. Can we do this? How about adding...? Can we make...? Before long, a complete vacation scene had developed from what had started as a picture of a boat on a lake. They were still streamlining and perfecting their procedures when the following listing was made.

It has been a pleasure to watch as they use LOGO to think in what Seymour Papert* calls "mind-sized bites." And as you might guess, the third graders are now using some of these procedures in their explorations of LOGO.

*Papert, Seymour. *Mindstorms: Children, Computers, and Powerful Ideas*. New York, Basic Books Inc., 1982.

VACATION

```

TO VANISH
  TELL :ALL
  HOME
  SH 0 SC 0 SS 0
END

10 JOG
  TELL [15 16 ]
  CARRY 15
  WAIT 10
  CARRY 25
  WAIT 10

```

```

CARRY 26
WAIT 10
JOG
END

```

```

TO PEOPLE
  CALL [15 16 ] "BATHERS"
  TELL :BATHERS
  CARRY 15
  SH 0 SC 1
  TELL 15 SXY 50 (- 15 )
  TELL 16 SXY 36 (- 14 )
  TELL 15
  SH 270 SS 5
  TELL 16 SH 270 SS 3
  JOG
END

```

```

TO GRASS
  MAKE "M 0
  REPEAT 32 [PT 121 :M 20 PT 121
  :M 21 PT 121 :M 22 PT 121 :M
  23 MAKE "M :M + 1 ]
  TELL TILE 121 SC [2 3 ]
END

```

```

TO BOAT
  TELL 9
  CARRY 9 SC 6 SXY 24 24
  TELL 12
  CARRY 12 SC 6 SXY 8 24
  TELL 10
  CARRY 10 SC 15 SXY 8 40
  TELL 11
  CARRY 11 SC 10 SXY 24 40
END

```

```

TO TREE
  CALL [1 2 1 ] "TOP"
  CALL [3 4 1 ] "TRUNKS"
  TELL :TOP CARRY :BALL
  SC 2 SXY - 35 16
  TELL 1 SH 270 FD 40
  TELL :TRUNKS CARRY :ROCKET
  SC 8 SXY - 35 0
  TELL 3 SH 270 FD 40
END

```

```

TO LAKE
  MAKE "J 0 REPEAT 32 [PT 100 :J
  10 PT 100 :J 9 MAKE "J :J + 1
  J
  TELL TILE 100 SC 5
END

```

```

TO BALLOON
  TELL 17
  CARRY 17
  SC 13
  SXY 10 60
  SH 90
  SS 2
END

```

```

TO ROAD
  MAKE "L 0
  REPEAT 32 [PT 113 :L 16 PT 113
  :L 17 PT 113 :L 18 PT 113 :L
  19 MAKE "L :L + 1 ]
  TELL TILE 113 SC [1 15 ]
END

```

```

TO TRAFFIC
  TELL 24
  CARRY 2 SC 6 SXY 0 (- 40 ) SH
  90 SS 20
END

```

```

TO CAR
  TELL 23
  CARRY 23 SXY 0 (- 46 ) SH 270
  SC 13 SS 26
END

```

```

TO BEACH
  MAKE "K 0
  REPEAT 32 [PT 105 :K 11 PT 105
  :K 12 PT 105 :K 13 PT 105 :K
  14 PT 105 :K 15 MAKE "K :K + 1
  J
  TELL TILE 105 SC [14 14 ]
END

```

Continued on p. 61



Dear Sir,

At the March meeting of the Texas Computer Education Association, TI allowed me to play with a prototype of their LOGO II Command Cartridge for a couple of hours. The first batch of GROMs for the new Command Cartridges has reportedly just been shipped off to be assembled, so the cartridges should be available from retailers by early summer (no kidding about this date). Unlike some computer manufacturers, TI continues to make most of their new software compatible with older equipment and software. Therefore, to upgrade a LOGO system to LOGO II, all you need is the new Command Cartridge. (This lists at \$129.95 but is available at a discount through many 99'er advertisers.) Of course the old LOGO Command Cartridge is still very good software, and you do not have to upgrade your system immediately.

I think the greatest feature of LOGO II is its music capabilities. TI's new Command Cartridge makes serious use of Jeanne Bamberger's theory that music is a good vehicle for cognitive development/problem solving. LOGO II allows users to create melodies in any combination of three voices. Music is added to a music-buffer with commands specifying the voice (SETVOICE 0, 1, 2 or 3; SETVOICE 0 clears out the music buffer) and the volume (e.g., SETVOLUME 1). To append notes to the end of the buffer (so that whatever is added becomes the next part of the melody), you use the command MUSIC, followed by a list of the notes (a range of about three octaves is available) and a list of the notes' durations.

LOGO II is consistent in its use of the SET command convention for the music commands SETVOLUME, SETVOICE, and SETTEMPO xx (which allows for different speeds of playing). Unfortunately, this does not allow consistent short forms since SV already means SETVELOCITY. Nor can PN stand for the command PLAYNOTE; PN is already the short form for PRINTNAMES.

Ordinarily, music played in LOGO II has continuous sound from the start of one note to the start of the next (unless a REST is specified) such as you would hear when music is played *legato*; the LEGATO command can be overridden with STACCATO. No music is played in LOGO II (even if there are instructions in the music buffer) unless the command PLAYMUSIC (or PM) is typed; then the whole buffer is played. If the command PLAYNOTE is typed, just one note in the buffer is played (the buffer keeps track of played and unplayed notes). LOGO II is much more than just a fancy *Music Maker* Command Cartridge. It allows you to write music with programs, to write music with recursive programs, to store music with your programs on disk or tape, and to combine music with SPRITE and Turtle programs. And you can use the Bamberger Tune Blocks games to learn music and to see the syntax of music.

The expansion of available memory from 8 to 16K is another important feature of LOGO II. Although some of this expansion was accomplished through code compaction, most of the memory savings was achieved by "overlaid" LOGO software into RAM so that less RAM is used. Ordinarily when overlays are used, there is a significant degradation in computer response time since pieces of code must be shunted back from GROM as they are needed and then overlaid. In my all too brief time with the new Command Cartridge, I could not detect any change in response time. If this is so, then the TI programmers have managed to overlay parts of LOGO that are never used (or rarely used) together. The near doubling of available memory decreases the likelihood that you will ever again have your computer "lock up" in LOGO because you are "out of space." To make the memory go even further, TI has restored (from very early prototypes) the forced garbage collection command (.GC) allows you to direct LOGO to clean up memory stacks and thus get much more mileage out of the memory). They have also enriched ERASE so that you can now erase not just programs, but names as well. A new operation called .NODES tells you how much memory is left.

Programs can now be printed on RS232-compatible printers through a new option added to SAVE. It appears as if there either is or soon will be an additional storage device or a way of recalling information from a RS232-compatible device (perhaps another TI LOGO system) since there is an undocumented OTHER Option as well. It will certainly be a relief to get hard copy from printers other than the thermal printer; its only redeeming feature was its low cost.

The manual that comes with the new Command Cartridge is quite a bit longer than the TI LOGO manual. The author, Dan Watt, is one of the early converts to LOGO from the old MIT LOGO lab, and his expertise is evident. Since he was allowed more pages for his manual, he was able to include some of the more ad-

PROMETHEUS SOFTWARE

We Have The Finest Quality Software Available For The TI99/4 Home Computer

Strategy Games

CHECKERS
REVERSI
CRIBBAGE
WARI
GO-MOKU
BLACKJACK PROFESSOR

Action Games

WAR OF THE WORMS
ASTEROID MINER
FROGLEGS
HELICOPTER ATTACK

Send today for a
FREE CATALOG
of all our programs!

Dealer Inquiries Invited

* * * * *

WANTED
Innovative Software
in the following
categories:

- ENTERTAINMENT
- BUSINESS APPLICATIONS
- UTILITIES
- EDUCATION

Let Prometheus Software take over the headaches of publishing your software. We are looking for quality programs in basic, pascal, or 9900 assembly code. Just send us a complete description of the software package. Our royalties are very competitive.

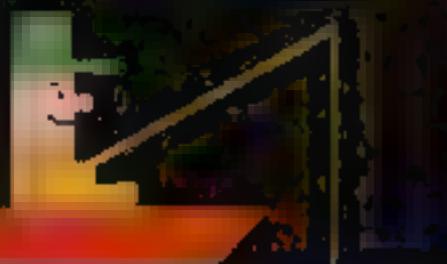
PROMETHEUS SOFTWARE

413 Lowell Ln.
Richardson, TX 75080

Continued on p. 72

EIGHT EASY PIECES

A REVIEW OF UPPER ROOM SOFTWARE FOR SPECIAL LEARNERS



By Judy Sanoian
Editor HGM Staff

From: Fair Good Excellent
Entertainment
Educational
Ease of Use
System Utilization

Good teachers seem to have an innate set of criteria they apply when selecting educational materials, be they books, filmstrips, games, or other items. They ask themselves: Will this hold my students' interest? What information does this impart or what skill will it develop? Is it simple enough for them to use and understand? Is it worth the price? When it comes to evaluating educational software, the criteria are no different. We all know of computer games that hold students transfixed for hours while they learn such valuable "skills" as space alien extermination or toad eradication. On the other side of the coin are the educational drills that have children fidgeting in their



chairs after five minutes. Finding materials that can both teach and hold the student's attention is essential. Well-designed software should also take maximum advantage of the computer's capabilities. After all, what is the point in spending hundreds of dollars on hardware when the program has students performing drills that could be done just as effectively with pencil and paper?

These criteria—and a few others—also apply when considering software for handicapped learners. The Upper Room Micro-computer Consultants have developed a package of educational software for handicapped students. Keeping the needs of non-readers in mind, these programs make extensive use of color graphics, animation, and synthetic speech. The eight programs cover a wide range of skills and subjects. *Keyboard Fun* is designed to help students identify and select the correct keys on the keyboard. *Early Counting Fun* offers drills in counting from 1 to 9. *Shark Counting* provides more extensive counting practice. The *Talking Typewriter* lets children identify letters, form words and construct sentences. *Fish and Count* integrates a counting activity within a game. *Addition* and *Subtraction* both offer drill

constant drilling. For example, *Early Counting Fun* requires the child to count the number of ducks, dogs or rabbits on each screen. If the answer is correct, the ducks flap their wings, the dogs sit down, and the white rabbits turn black. Once this straightforward drill is mastered, there is a more challenging game, *Shark Counting*, to further exercise counting skills. With all the exercises, an incorrect response will—if you have the Speech Synthesizer—result in a variety of voices and intonations. Keeping sensitive egos in mind, the program never tells a student he is wrong. There is, however, a problem with some of the games' responses. If the program is run without the Speech Synthesizer, there is virtually no response. In *Keyboard Trainer*, for example, the student must identify the flashing typewriter key by pressing the correct key on the keyboard. Without the optional Speech Synthesizer, a correct answer receives no reinforcement—no "good job," victory music, or graphic display. The exercise merely goes on to the next letter. It is probably not necessary to go into the importance of positive reinforcement. We all need a pat on the back, and children usually like a loud, colorful one.

Continued on p. 74

and practice in simple arithmetic problems. Finally, *Basic Arithmetic* provides problem-solving activities in addition, subtraction, multiplication, and division. A manual for running the programs is included with each of the packages. The program designers mention an important point in their introduction: "The computer should never become a replacement for sensitive one-on-one human contact." Bearing this—and the special needs of handicapped learners—in mind, let's see how Upper Room's packages measure up.

Will It Hold Their Attention? First of all, we should never assume a student will be captivated by an uninteresting, repetitive drill simply because she is a slow learner. In other words, the attention span does not lengthen proportionately with the level of handicap. Upper Room takes this into account. While some of the exercises are, necessarily, very simple, Upper Room usually adds an incentive—a fun part—to engage the student's interest. They also present exercises on several levels when skills (such as learning to count require



FFF Software Presents . . .

SHUTTLE COMMAND

Earth is threatened by thousands of Russian Attack Military Satellites (RAMS). The United States readies the space shuttle Enterprise to combat the menace and selects you as its commander.

Your view is from the cockpit and you see the RAMS approach (in 3-D) from deep space. Your mission is to destroy them before they destroy Earth - or you!

The producers of the now-classic TI-ASTEROIDS bring you a new and challenging space game. Joysticks are optional, but recommended, for this exciting Extended BASIC program which features 1 or 2 player capability, 12 skill levels and great graphic effects.

Available for only \$17.50 on cassette or diskette

Also Available . . .

TI-ASTEROIDS*

See what the Experts are saying:

" *TI-ASTEROIDS is by far the best space game we have seen programmed for the 99/4 in an [Extended] BASIC Language.*"

Charles LaFara, President
International 99/4(A) Users Group
Newsletter (Vol. 1, No. 7)

" *I was impressed to see what could be done in Extended BASIC . . . by such firms as FFF Software (Trenton, NJ) with their TI-ASTEROIDS game . . .*"

Gary M. Kaplan, Editor
99'er Magazine (Vol. 1, No. 4)

Available for \$17.50 on cassette or diskette
or for only \$10.00 if purchased
together with SHUTTLE COMMAND.

*Not associated with Texas Instruments, Inc.

FFF SOFTWARE
TO ORDER WRITE:
P. O. Box 4169
Trenton, NJ 08610

LOGO Turtle . . . from p. 58

```
TO SAIL
CALL [9 10 11 12 3 "BT
TELL :BT SH 90 WAIT 50 SS 15
END

TO PARK
MAKE "L 0
REPEAT 32 [PT 113 :L 16 PT 113
:IL 17 PT 113 :L 18 PT 113 :L
19 MAKE "L :L + 1 ]
TELL TILE 113 SC [1 15 ]
END

TO SKY
TELL 5
CARRY :BALL SC 10 SKY 100 BS
END
```

TO VACATION
BALLOON
ROAD
TRAFFIC
CAR
BEACH
LAKE
TREE
SKY
BOAT
SAIL
GRASS
PEOPLE
END



DeBUGS ON DiSPLAY



99'er Program Bug

and B's to be sure you have typed in the right character. The program does run fine.

A line was left out of **The School Secretary's Secretary** in the May issue on p. 39 top of the second column. That sentence should begin: "The application will display THAT CODE HAS BEEN USED if you . . ."

We have uncovered a mild-mannered Debug in Super Language: Programming Sprites in Mini Memory (April, 1983). In Part 13 of the listing (p. 61) the AORG > 7FF8 should read > 7FE8 and DATA > 7FF8 should also read > 7FE8. To those who had trouble keying in **Giant & Dwarfs** (April, 1983, p. 24) - a word of advice: check all 8's

In this same May's issue, on p. 60 in the *Explanation of the Program* for **Index**, please subtract 70 from all line numbers beginning at line 280. The last line will then be 3420.

ATTENTION PROGRAMMERS!!

DATASOFT is currently seeking programs and programmers to add to their rapidly growing and expanding operation. A leading marketer and developer of personal computer software, DATASOFT offers experienced assembly-language programmers the opportunity to join their staff to develop and translate arcade games such as ZAXXON™, as well as to author original material for their games, education and home management product lines. DATASOFT pays competitive salaries, plus bonuses based on product performance. Relocation assistance is available, if needed.

If you have working knowledge of Atari, Apple, TI, or Commodore operating systems, graphics, animation and sound, call or write Melinda Storch at:

Datasoft Inc.

9421 Winnetka Ave
Chatsworth CA 91311
(213) 701-5161 / (800) 427-5916

ZAXXON and SEGA are registered trademarks of Sega Enterprises. DATASOFT is a registered trademark of Datasoft, Inc.

LEARN ASSEMBLY LANGUAGE

The DOW EDITOR/ASSEMBLER was designed for those who want to learn assembly language using TI's Mini Memory Module. Without this assembler and its full editing capabilities, you will have to modify already assembled code to get a program to work. But with this assembler, you can work on the program just as you entered it, complete with symbolic instructions, labels, and remarks. You can even run the program, change it and run it again, just as you do with Basic.

You will be able to:

- 1) Save your unassembled program on cassette;
- 2) Restore it from cassette;
- 3) List it to a printer;
- 4) Delete statements;
- 5) Insert statements;
- 6) Change statements;
- 7) Use the full 4K RAM;
- 8) Use all of the TI99/4's instructions;
- 9) Use 6 assembler directives.

Included: DOW EDITOR/ASSEMBLER on cassette with instruction manual containing a demonstration program.

Required: TI99/4(A), cassette recorder with cable, Mini Memory Module, and TI's Editor/Assembler Manual.

Send \$25.00 to

JOHN T. DOW
6360 CATON
PITTSBURGH, PA 15217
(PA residents add 6%)



Joy Talk is Cheap

A Low-Cost RS232 Interface Through the TI-99/4A Joystick Port

By Paul Urbanus

6302 Elgin #278
Lubbock, TX 79413

Caveat Joytalker

This article is not for the beginner. If you have electronic construction experience (and some skill in soldering) you can successfully complete the Joytalk system. The hardware required approximately 8 hours to fabricate (including time to gather the parts) in the 99'er lab. The cost for all the parts was under \$40. Remember, a mistake in hardware construction is more costly than in software construction—it cannot be corrected with just a few keystrokes!

In the process of computer programming, there eventually comes a time to communicate your results to the outside world. For personal computers, the RS232 serial interface has become the standard link allowing you to communicate to a printer, a plotter, or other peripheral. This first article will describe the hardware required to implement the RS232 output function through the joystick port of the TI-99/4A. (Software will be covered next month.) In this way, users who don't have a peripheral expansion system can output to a printer or other serial device using only a Mini Memory cartridge and some low-cost hardware. The software/hardware combination allows the setting of baud rate (110–19.2K), stop bits, parity, and auto carriage return/line feed. The worst baud rate error occurs at 19.2K baud, and is less than 0.2%. A provision is also included to add baud rates which are not preprogrammed.

To better understand the hardware and software design tasks, a definition of "RS232" is needed. RS232 is a serial communications standard which defines both electrical specifications and a data transfer protocol. Its electrical characteristics include such things as voltage and loading levels. The relationship between these logic and voltage levels is of interest to us. Notice that the electrical levels are inverted from the logic levels (logic 0 = +V and logic 1 = -V) for RS232.

A transfer protocol is needed for proper flow of data. For the RS232, this protocol specifies the serial data format, as well as the method of handshaking. The handshaking in this

case involves checking the DATA TERMINAL READY signal to ensure that the remote device (i.e., the printer) is ready to accept data. The serial data format is shown in Figure 1. Notice that there are four distinct pieces which are put together to form the actual data which is transmitted. In this case, an ASCII "A" which occupies seven bits is being transmitted. There are also 3 control bits, which are required both to mark the beginning (START BIT) and end (STOP BIT) of a character, and to perform limited error checking (PARITY BIT). Thus 10 bits are actually transmitted (7 character bits + 3 control bits). For every character transferred, 3 extra bits have been added to "control" the transfer. These control bits are completely transparent to an RS232 user, who merely sends the 7-bit character code to an output subroutine, at which point the control bits are added. Conversely, the receiving device strips off the 3 control bits and uses only the 7-bit character. In the time between transmission of characters, the output logic level is set to 1 (negative RS232 level).

The Hardware

Before the hardware design is started, the I/O structure of the joystick port must be determined. In the 99/4A, the keyboard and joysticks are mapped into an 8 by 8 matrix. The matrix column select lines are *active low*, and are driven by an 8-output *open-collector decoder*. This decoder is controlled by three lines from the system I/O chip (TMS9901). Six of the column selects scan the keyboard. The remaining two are buffered and brought out to the joystick port to select player 1 or player 2 input (or neither). There are five input lines from the joystick input (UP, DOWN, LEFT, RIGHT, and FIRE), but only one joystick select line may be active at a time. Two pins on the joystick port have no internal connection. The absence of power or ground on the joystick port poses a problem. To get around this, ground and +12V must be stolen from the video output connector where they are provided to power the RF modulator.

Given the joystick port structure and available power, im-

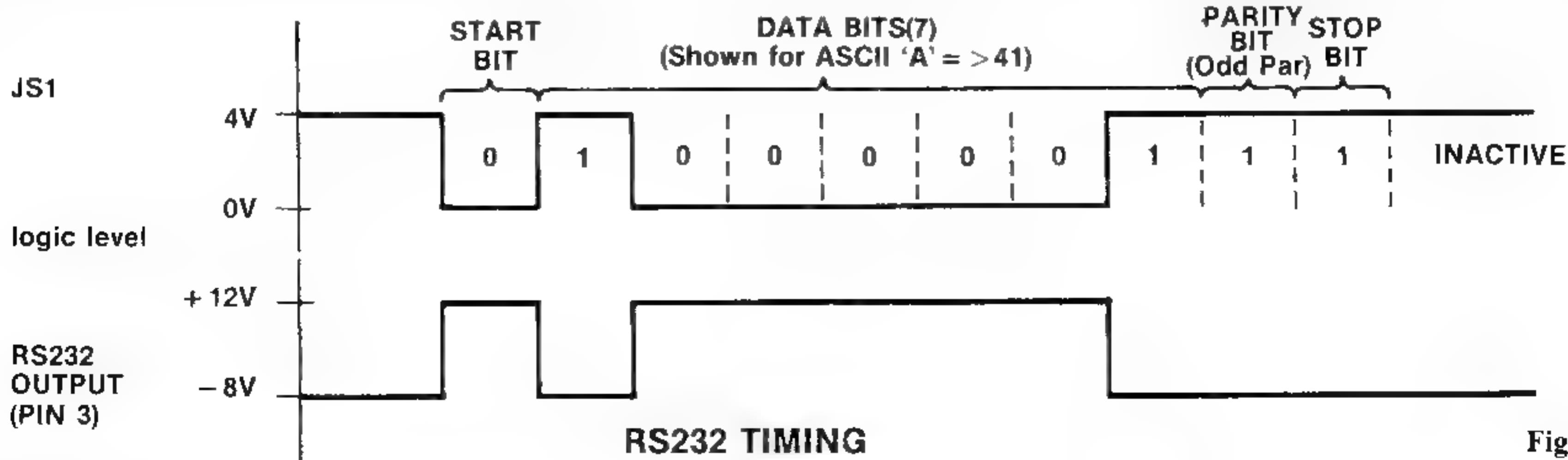


Figure 1



Top photo: JoyRAIK interface between a printer and the Home Computer
Bottom photo: The completed JoyRAIK interface minus the case

presenting the RS232 output interface requires three basic blocks:

1. A negative supply voltage to generate the negative voltage (-5v) as required by the RS232 standard.
2. Circuitry to translate the joystick select line to RS232 compatible levels. It is necessary to maintain the RS232 serial output at an active-low level when the joystick select is inactive. This occurs so that the joystick select line is inverted otherwise the remote device will see continuous start bits. Since RS232 levels are bipolar (see Figure 1), the inverter stage must have a bipolar output.
3. Finally, some creativity is needed to translate the printer busy signal to a level which moves between +11v and ground, and is also compatible with the scan matrix levels. If the "device busy" is asserted when the keyboard is being scanned, improper results will be returned. Therefore the busy signal needs to be gated onto the scan matrix only while it needs to be checked. The remaining joystick select is used for getting control.

The completed hardware design is shown in Figure 4. A look at this schematic reveals the details of the design. The negative voltage is easily generated using a charge and dump technique. At the heart of the design is a 555 timer C1 free running at approximately 10 Hz. On the positive half of each output cycle, capacitor C3 is charged through D1. When the output transitions to ground, D1 turns on and D2 turns on, allowing C3 to dump part of its charge into C4. C4 holds the negative voltage level while C3 is recharging.

For the RS232 output, both level translation and inversion must be performed. A common-emitter circuit consisting of Q3, D3, R3, R4, RS forms an inverter with bipolar output levels. When the joystick select (JS1) is inactive (+4v), Q3 should be off, and the RS232 output will be negative (Figure 1). An active (0v) joystick select should turn on D3 and Q3 raising the RS232 output voltage to +11, allowing for voltage of approximately 2 volts. This is the desired threshold voltage

CINTRONICS

"The Printer People"

2284 Donnington Lane

Cincinnati, OH 45244

513/721-7704

Authorized Service Center for C. Itoh

Be assured that Cintronics will not sell you a printer unless it is totally compatible with your TI computer. Each printer and cable is pre-tested before shipment.

DOT MATRIX PRINTERS*

C. ITOH - One Year Warranty

Prowriter 8510 Parallel	399
Prowriter 8510 Serial	549
Prowriter 1550 Ser/Par	726
Prowriter 1550 Parallel	879
STAR MICRONICS - 180 Day Warranty	
Gemini-10	369
Gemini-15	539

For package including word processing, mail-merge programs and cable add \$70 to above prices

DAISY WHEEL PRINTERS*

C. ITOH - One Year Warranty

Starwriter F10-40	1249
Printmaster F10-55	1519
SMITH-CORONA - 90 Day Warranty	

TP-1

Check our special package prices for printer/TI peripheral combinations.

ACCESSORIES**

RS232 or Parallel Cable	29.95
Ribbons for C. Itoh Printer	5.95
Ribbons for TP-1	6.95
Elephant Memory System Disks	

5 1/4" SS/SD Box of 10

17.95

Elephant Trunk

5 1/4" Floppy Disk Storage

21.95

Head Cleaning Kit (5 1/4")

24.95

Cloth Printer Cover

12.95

SHIPPING - Please include:

*2%

**\$1.50 for first item and 25¢ each additional item

Prices shown are for prepaid orders.

Allow 2 weeks for personal checks to clear.

All prices and offers subject to change without notice.

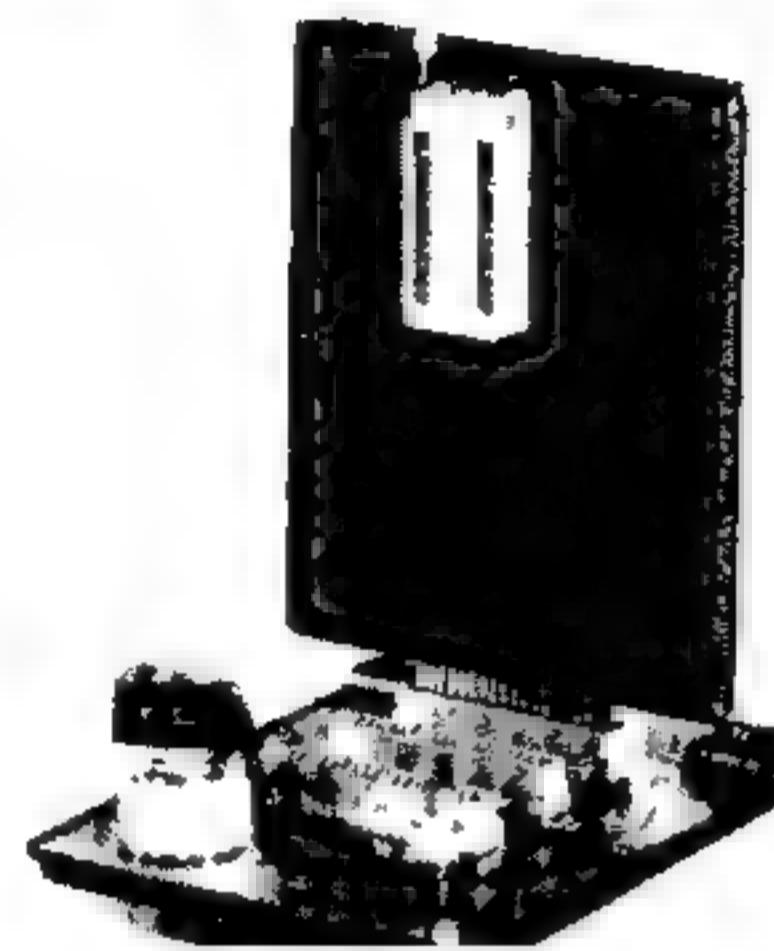
Cintronics is dedicated to provide quality service. We welcome calls for technical assistance.

NEW ROMOX™

**"PROGRAMMABLE" CARTRIDGES
AND A CARTRIDGE PROGRAMMER**

for TI-99/4A computers

A totally new concept in computer cartridges. Now anyone can put their own programs on a cartridge. The Cartridge Programmer is actually a unique EPROM programmer with a special adapter to program the ROMOX Programmable cartridge. The Cartridge Programmer comes complete with instructions explaining how to write programs that will operate from cartridges. The EPROM programmer can also be used to program 2716, 2732 and 2764 EPROMS in less than 2 Minutes from programs stored on diskette. We also have a growing selection of ROMOX pre-programmed ARCADE GAME cartridges including PRINCESS AND FROG, ANTEATER and the newly released HEN-PECKED.



for more information and price list write

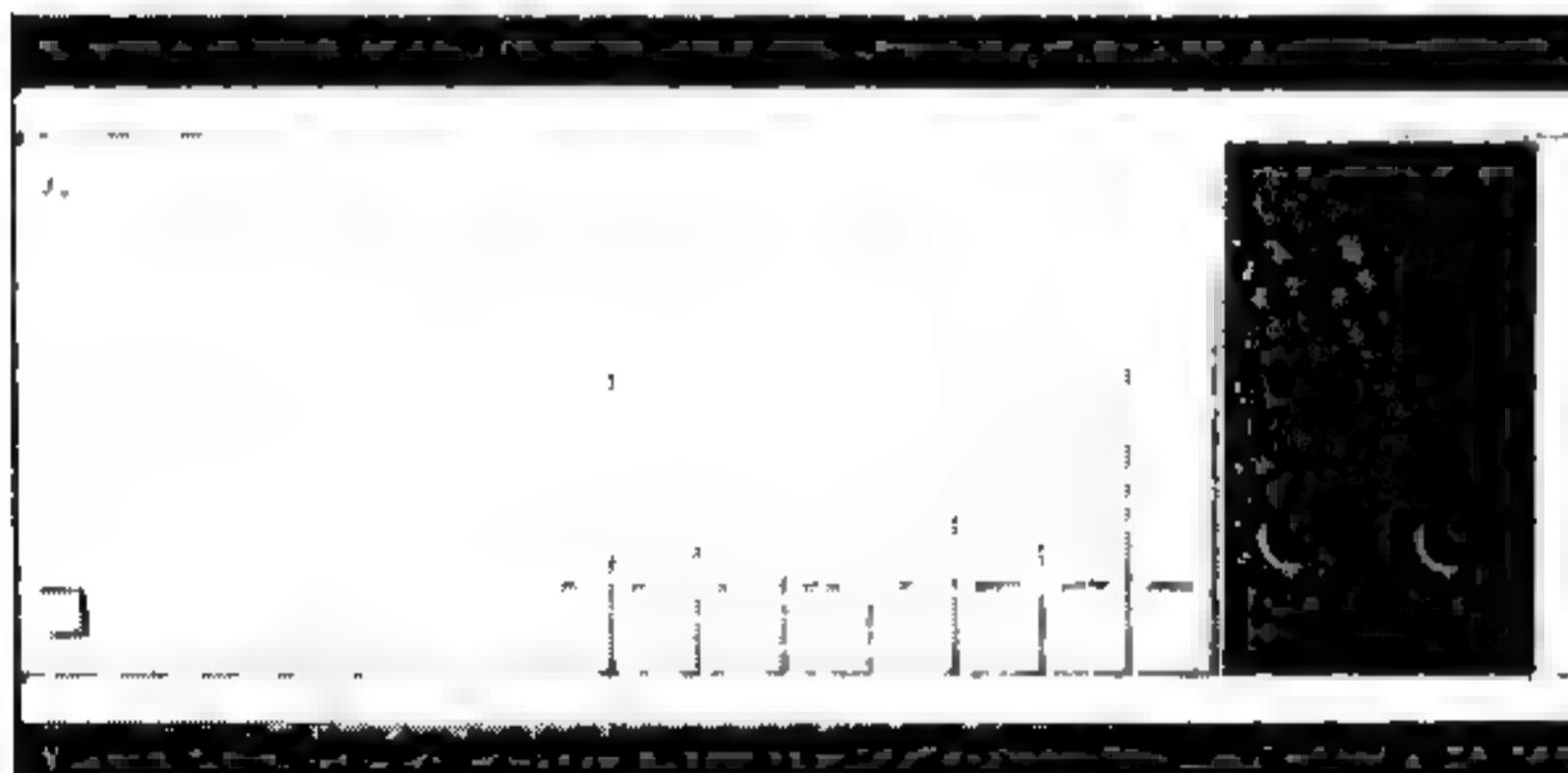
NAVARONE INDUSTRIES

510 LAWRENCE EXPRESSWAY #800
SJNNYVALE, CALIFORNIA 94086

ROMOX is registered Trade Mark of ROMOX, Inc

**MORE SUPER DISK SPECIALS
from WESTERN MICRO SYSTEMS**

- New half-height, low-power design allows two-drive mounting as pictured
- Run both single & double density
- Compatible with all TI software & hardware
- Full 120-day warranty



PRICES

Single-sided, 40 track drive...	from \$199.00
Double-sided, 40 track drive...	from \$265.00
Filler plate (for one drive).....	\$5.00
Installation kit (required for mounting two drives)	\$25.00
Star Gemini 10 Printer (with cable).....	\$409.00
Full-size drives also available.....	Call

**WMS/2760 S. Havana, Suite S
Aurora, CO 80014**

**Shipping included for pre-paid
Visa, MC, COD, 4% handling**

Order line, 1-800-641-3885

Technical info (303) 337-5909

because it is midway between the joystick output levels. R4 protects Q3 from output shorts, while R3 limits zener current.

Finally, Q1, Q2, D4, R1, and R2 buffer and gate the busy signal. Q2 performs the gating function by keeping the collector of Q1 in the high impedance state if the JS2 output is inactive (high). When JS2 is active (low = 0V), Q2 turns off, allowing the busy input level to ground. The DOWN joystick level is inverted from the actual RS232 level.

Construction Notes

All of the wire needed to construct the project was obtained from one six foot cable (5-pin DIN to 5-pin DIN) purchased at Radio Shack (Cat. number 42-2151). Starting at one end of the cable, the connector with about 9 inches of cable was cut off to be used for connector J2 as shown in Figure 2 (plugs into the TI-99/4A monitor jack). From the same end of the cable, a 10-inch section of cable was cut off for use with the 9 pin D-type connector (plugs into the joystick port). At each of the three ends, about an inch of the thick outside cable jacket was carefully cut away from the wires inside. There are four wires inside: red, white, black, and yellow. Each wire is wrapped in fine copper wire strands. Unwind the strands from each wire and cut off all of them except for one set which should be carefully twisted into a fifth wire. To obtain wire for hooking up the components in the box, cut another 20" section of cable. Carefully cut away the entire outside grey jacket from this section, unwind the copper strands from the four colored wires, and discard the strands.

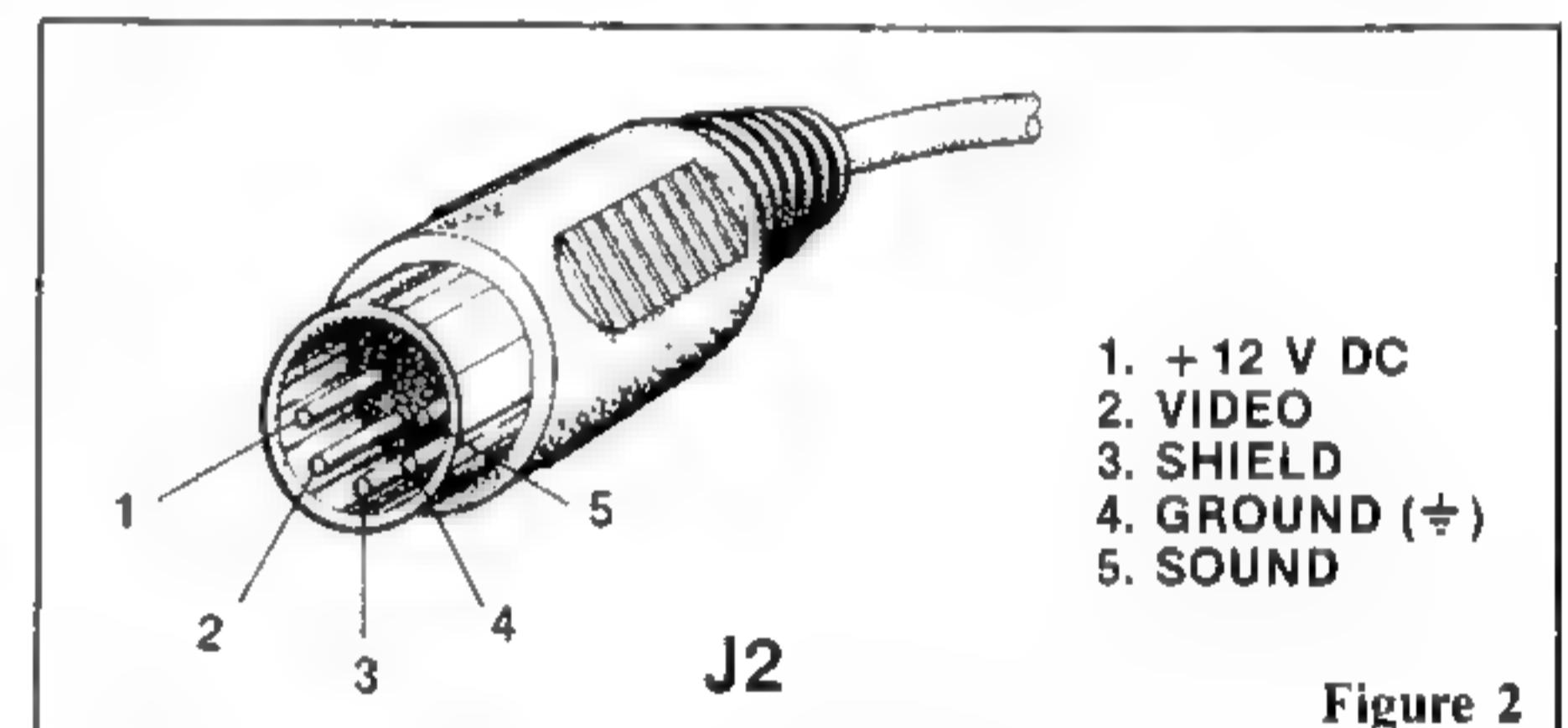


Figure 2

Step two in the construction phase consists of cutting the holes on the back plate of the Radio Shack case (Cat. number 270-218). Follow the hole-drilling template in Figure 7 (see p. 71). Drill very gently so the plastic plate does not crack. Using 4-40 screws and nuts, fasten the connectors J3 and J4 into their respective holes. Be sure to place the connectors through the mounting holes from the outside of the plate. Then pass the prepared cable end of the 5-pin DIN male connector through the plate marked for J2 in Figure 7. Lay the panel aside for now and prepare the J1 connector cable assembly. Connect the wires as shown in Figure 3. (Note that even though only three wires are required, all five connections are made; this adds strength to the cable and does not affect the operation). Pass the free end of the J1 cable through the hole for the J1 cable in the rear panel. The rear panel is now ready to be attached to the circuit board.

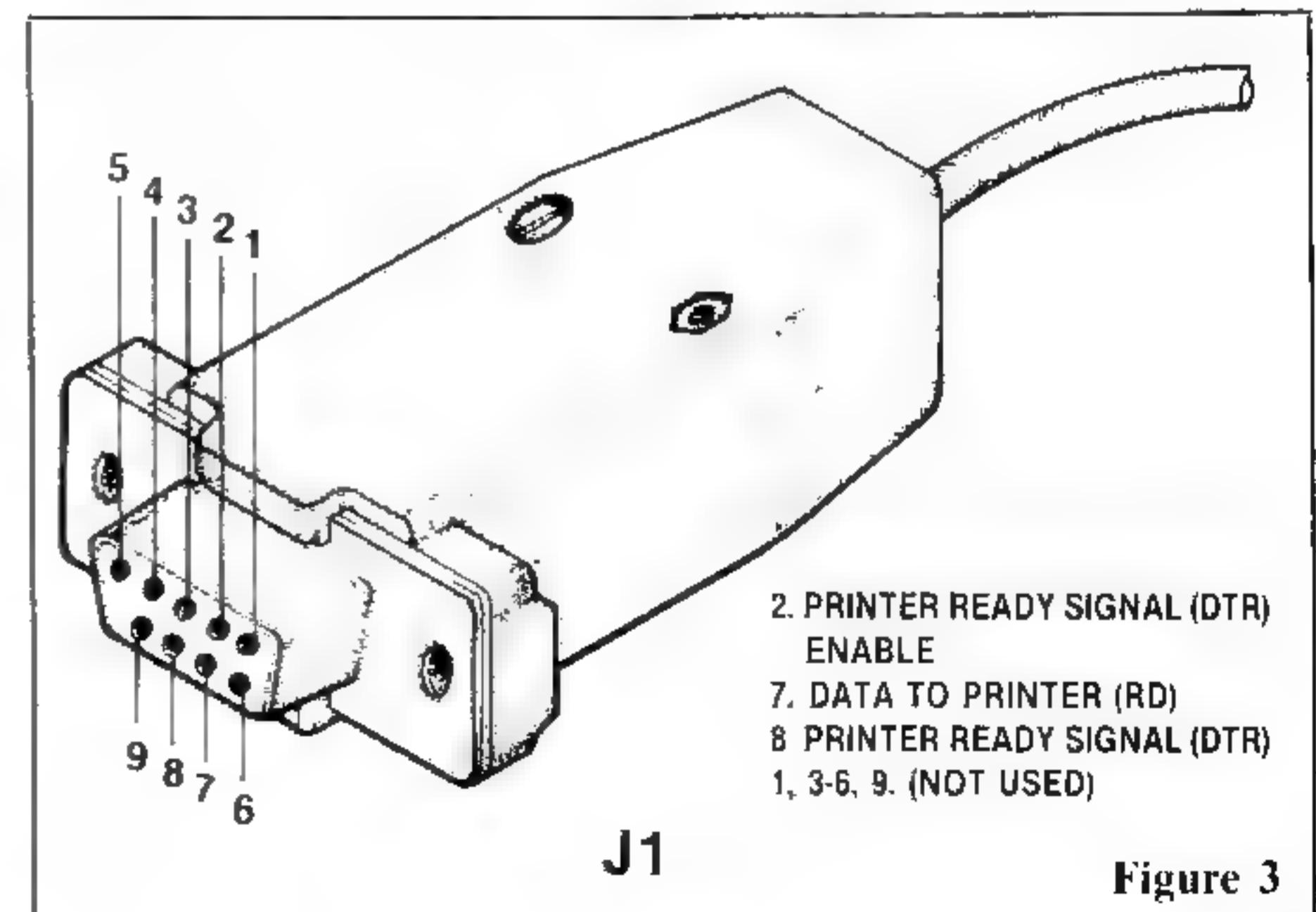
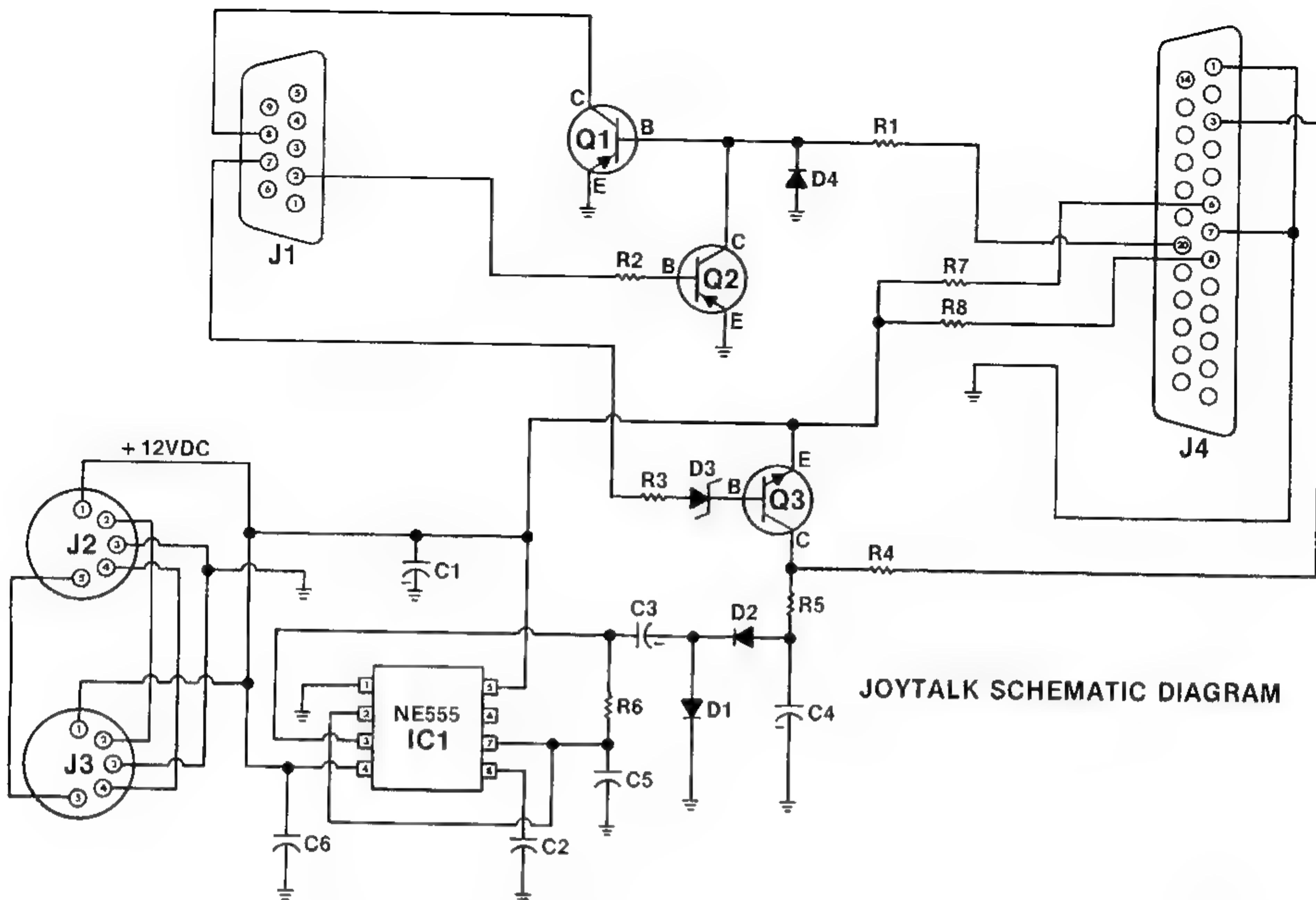


Figure 3



JOYTALK SCHEMATIC DIAGRAM

Figure 4

PARTS LIST FOR JOYTALK

SCHEMATIC SYMBOL	RADIO SHACK QTY	PART NO.	DESCRIPTION
J1	1	276-1538	D-Subminiature female 9-position connector
	1	276-1539	9-position D-Subminiature connector hood for above
J2	1	42-2151	6-foot 5-pin to 5-pin DIN cable (use one end)
J3	1	274-005	5-pin chassis socket DIN type
J4	1	276-1548	D-Subminiature female 25-position connector
IC1	1	276-1723	Integrated Circuit Timer (NE555)
Q1, Q2	2	276-2016	NPN transistor (2N3904)
Q3	1	276-2034	PNP transistor (2N3906)
D1, D2, D4	3	276-1620	switching diode (1N914)
D3	1	276-562	9.1V zener diode (1N4739)
C1	1	272-1016	100 μ F/3.5v electrolytic capacitor
C3, C4	3	272-1015	47 μ F/35v electrolytic capacitor
C2, C5, C6	3	272-135	0.1 μ F disk capacitors
R1, R2			
R4, R5, R6			
R7, R8	7	271-1328	3.3K ohm, 1/4 watt resistor
R3	1	271-1317	470 ohm, 1/4 watt resistor
	1	270-218	Deluxe Plastic Enclosure (2 1/8" x 5" x 5 1/4")
	1	276-1995	8 pin low profile socket (for NE555 IC)
	1	276-162	IC-LSI Perboard (for mounting circuit parts)
	4	64-3011	4 40 x 1/4" steel round head machine screws
	4	64-3018	4 40 steel hex machine screw nuts
(optional)	1	64-2801	Science Fair Electronic Tool Set (includes 30 watt soldering iron, needle nosed pliers, wire cutters, screwdrivers, etc.)

[A version of the JoyTalk device is available in a more compact design as a commercial product from one of our advertisers. JOYPRINT (tm) is offered as a finished product from Model Masters at 2512B E. Fender Ave., Fullerton, CA 92631. The suggested retail price for JOYPRINT is \$59.95 (for those of you unwilling to endure the experience of building JoyTalk from scratch).—Ed.]

Continued



Reach for MICRO-ED!

Over 100
Educational
Programs for

- Texas
Instruments
99/4A

Dealer
Inquiries
Invited

Send for FREE CATALOG

Please Send me your
FREE CATALOG
For TI

Name _____

Address _____

City _____

State _____ Zip _____

Micro-Ed, Inc.
P.O. Box 24156
Minneapolis, MN 55424

You can call
us at
612-926-2292

CUMBERLAND TECHNOLOGY

10 Wagner Drive
Carlisle, PA 17013

99/4(A) Programs

- ENGINEERING
- MATH
- PROGRAMMING AIDS
- GAMES
- Many programs written in Assembly Language

*Please send name and address
for a current list*

99/4 ACCESSORIES SINGLE STEP ADAPTER

WORKS WITH ED FOR ASSEMBLER DEBUG HAS LOAD
INTERRUPT TO RETURN TO DEBUG 44.95
WITH 2K RAM (EXPANDABLE TO 8K) 54.95

DOUBLE DENSITY UPGRADE KIT
FOR PHP 800 DISK CONTROLLER OPERATES SINGLE
OR DOUBLE DENSITY UP TO FOUR SINGLE OR DOU-
BLE SIDED DRIVES \$249.95

PROTOTYPE BOARD

FOR EXPANSION CHASSIS HOLDS 60 6 PIN DIPS &
REGULATOR WITH OUTPUT CONNECTOR 39.95

EXTENDER BOARD

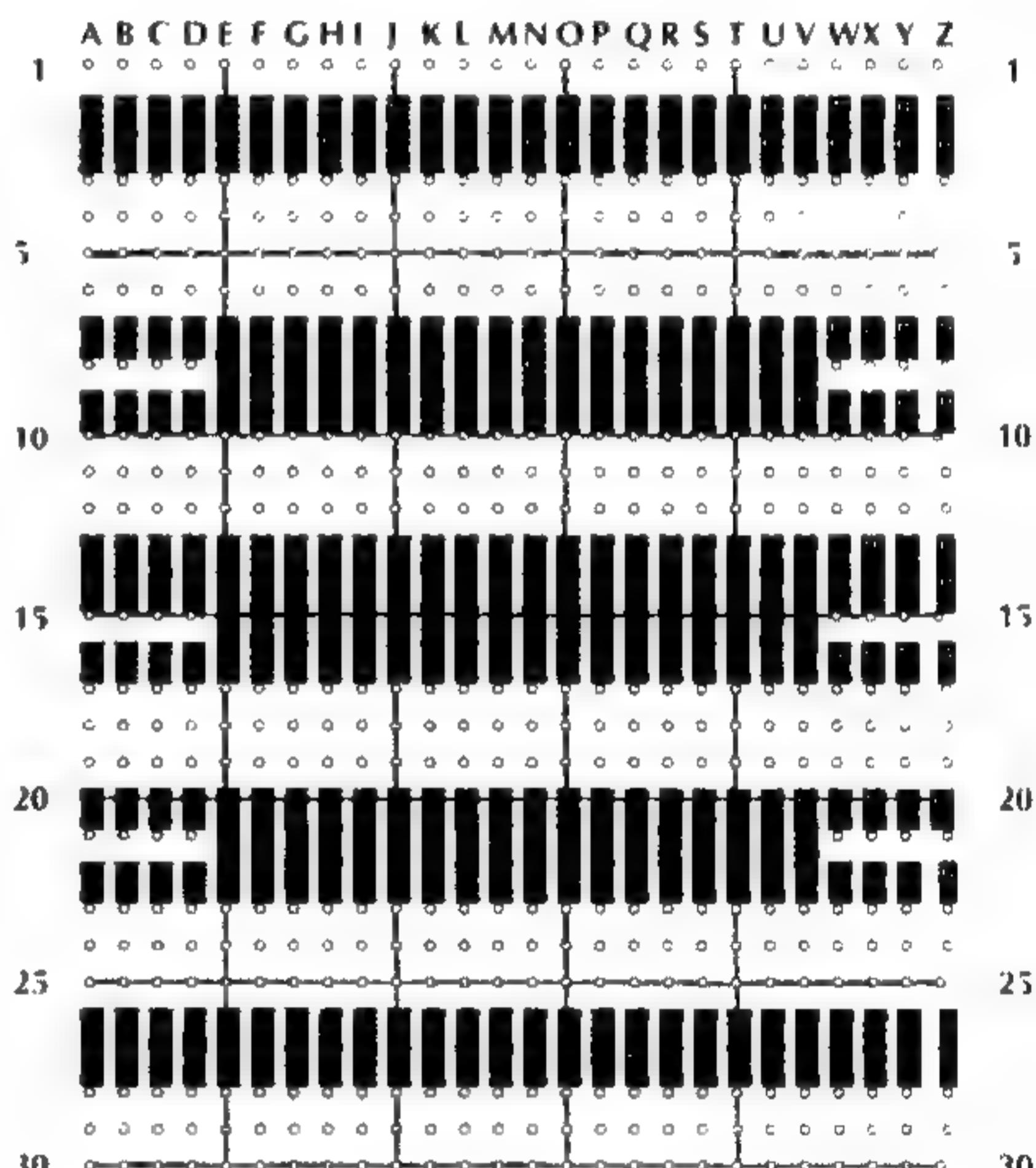
FITS EXPANSION CHASSIS FOR EASY TROUBLE
SHOOTING & SERVICE 29.95
ADD \$3.00 SHIPPING & HANDLING

SPECIALTY SERVICES

511 Martha, Euless, TX 76039
817 267 8338 TELEPHONE
ANSWERED M-F 6-10PM, OR
LEAVE MESSAGE

MC VISA
PERSONAL CHECKS
ALLOW 2 WEEKS
TO CLEAR
TX RESIDENTS
ADD 5% SALES TAX

WRITE OR CALL FOR ADDITIONAL INFORMATION
ON OUR OTHER FINE PRODUCTS DEALER AND
INDUSTRIAL INQUIRIES WELCOME



JOYTALK CIRCUIT BOARD

Figure 5

The Radio Shack circuit board (Cat. number 276-162) has a grid of holes, predrilled on tenth-inch centers. On one side of the board, copper foil "traces" connect certain holes in the grid. This side is called the *solder* side of the board. The opposite side is referred to as the *component* side (it has white printed markings on it). Each side is labeled with numbers down the side and letters across the top (see Figure 5). Thus, any hole on the board grid can be

referenced by a number and a letter (e.g., the 10G location in the point-to-point wiring chart (Figure 6) which may be used with the schematic as an aid in construction).

Next month, we continue with the actual Assembly Language program for Mini Memory that will make this hardware come to life. Also, a simple test routine will be presented. Until then, good luck and have fun!

**At last! Software for
16K TI BASIC**

No special hardware required.

DIYAD

unique DIY adventure. Invent adventures for yourself and others. Store as many as you want on tape. Optional randomization fills even your own inventions with surprise and challenge! Includes adventure compiling program, playing program, plus desert island adventure to get you started. DIYAD is limited only by your own imagination! \$17.95

TOAD GRAPHICS

LOGO too expensive? TOAD GRAPHICS has many of the features of turtle graphics at a fraction of the price, and no extra hardware cost. Toad moves about the screen drawing pictures with tiles. Recursive procedures, loops, conditional branches, etc. An immediately appealing way to enjoy learning programming concepts! \$17.95

SAVE \$6! BOTH TAPES \$29.95

Cassette only plus full, easy to follow documentation. Checks or money orders to:

WELCOM SOFTWARE
2952 MEADOWGRASS LANE
HOUSTON, TX 77082

JUST PLAYING GAMES?

You could be designing them with

**THE MAXIMUM ASSEMBLER
FOR THE MINI-MEMORY MODULE**

Without spending hundreds of dollars for disk and peripherals, you can have this effective tool for creating **LARGE** programs in high-speed assembly language. Requires just the Mini-Memory Module, a cassette recorder, and your TI99/4A console.

THE MAXIMUM Assembler outperforms the Line-By-Line Assembler that comes with the MMM.

Compare these features

	Line-By-Line	THE MAX
User Program	760 bytes	3808 bytes
Object Size	1 or 2 chars	1 to 6 chars
Label Size	10	100 plus
Saving Source Input	No	Yes
Source Editing	limited	complete
Full Instruction Set	yes	yes
Access to Utility	Subroutines	by EQU only
	Odd Byte-alignment	not allowed
	Directives	minimal
		directly by name
		fully supported
		greatly enhanced

Get **THE MAX**, the smart assembler, and start creating your own powerful software for the TI99/4A.

PRICE: \$25.00

Instructions included with cassette. Send check or, for faster service, money order to:

M. K. ECKHAUS

P.O. Box 1079 — Elgin, Illinois 60120

Inquiry honored only with SASE.
*T.I. Editor/Assembler manual recommended—may be ordered from T.I.

Figure 6 JOYTALK POINT-TO-POINT WIRING CHART

FROM CLK	LOCATION	LEAD OF COMPONENT	COMPONENT	LEAD OF COMPONENT	TO GRID LOCATION
2L		END	C4	END	2T
3L		END	R6	END	3M
2M		END	JUMPER	END	8L
3K		END	JUMPER	END	8K
3N		END	JUMPER	END	7I
2O		-	C4	-	2Y
3O		B1K	I1	CLR	1I
4T		B1K	I2	CLR	4I
3Y		END	JUMPER	END	14M
3O		END	JUMPER	END	1N
8I		END	JUMPER	END	8I
8		END	C2	END	8K
9I		END	C3	END	9L
10I		END	C6	END	10N
9A		END	JUMPER	END	14K
10		END	JUMPER	END	20I
4K		PIN4	R1		
4L		PIN3	I01		
4M		PIN2	I01		
4N		PIN1	I01		
7K		PIN5	R1		
7L		PIN6	C1		
7M		PIN7	C1		
7N		PIN8	C1		
10D		END	R3	END	14G
1		CO1	Q3		
13		BAS	Q1		
15K		FME	Q3		
15O		C1R	I4	BAR	13I
4D		END	JUMPER	END	26D
4G		C1R	I3	BAR	14I
4Q		END	JUMPER	END	14S
5I		END	R5	END	15M
5P		BAS	Q2		
5Q		CO1	Q2		
5S		FME	Q1		
15T		BAS	Q1		
15U		CO1	Q1		
16B		END	R2	END	16P
6Q		END	JUMPER	END	16I
17		END	JUMPER	END	20B
7K		END	JUMPER	END	10X
7O		END	JUMPER	END	21F
7T		END	JUMPER	END	21D
2-E		END	JUMPER	END	12X
2-O		PIN1	I4		
2-E		PIN2	C3		
24S		END	R	END	24S
24		END	R8	END	16I
24V		END	R5	END	16A
3A		END	R4	END	16X
27		PIN1	J3		
27F		PIN2	J3		
27		PIN4	J3		
27K		PIN5	J3		
27		PIN6	J4		
2		PIN7	J4		
27X		PIN8	J4		
28A		END	J1		
28B		END	J1		
28C		PIN4	J1		
28D		PIN5	J1		
28E		PIN6	J1		
28F		PIN7	J1		
28G		PIN8	J1		
28H		END	J2		
28I		PIN2	J2		
28J		PIN3	J2		
28K		PIN4	J2		
28L		PIN5	J2		
28M		PIN6	J2		
28N		PIN7	J2		
28O		PIN8	J2		
28P		END	J3		
28Q		PIN2	J3		
28R		PIN3	J3		
28S		PIN4	J3		
28T		PIN5	J3		
28U		PIN6	J3		
28V		PIN7	J3		
28W		PIN8	J3		
28X		END	J4		
28Y		PIN2	J4		
28Z		PIN3	J4		
28A		PIN4	J4		
28B		PIN5	J4		
28C		PIN6	J4		
28D		PIN7	J4		
28E		PIN8	J4		
28F		END	J5		
28G		PIN2	J5		
28H		PIN3	J5		
28I		PIN4	J5		
28J		PIN5	J5		
28K		PIN6	J5		
28L		PIN7	J5		
28M		PIN8	J5		
28N		END	J6		
28O		PIN2	J6		
28P		PIN3	J6		
28Q		PIN4	J6		
28R		PIN5	J6		
28S		PIN6	J6		
28T		PIN7	J6		
28U		PIN8	J6		
28V		END	J7		
28W		PIN2	J7		
28X		PIN3	J7		
28Y		PIN4	J7		
28Z		PIN5	J7		
28A		PIN6	J7		
28B		PIN7	J7		
28C		PIN8	J7		
28D		END	J8		
28E		PIN2	J8		
28F		PIN3	J8		
28G		PIN4	J8		
28H		PIN5	J8		
28I		PIN6	J8		
28J		PIN7	J8		
28K		PIN8	J8		
28L		END	J9		
28M		PIN2	J9		
28N		PIN3	J9		
28O		PIN4	J9		
28P		PIN5	J9		
28Q		PIN6	J9		
28R		PIN7	J9		
28S		PIN8	J9		
28T		END	J10		
28U		PIN2	J10		
28V		PIN3	J10		
28W		PIN4	J10		
28X		PIN5	J10		
28Y		PIN6	J10		
28Z		PIN7	J10		
28A		PIN8	J10		
28B		END	J11		
28C		PIN2	J11		
28D		PIN3	J11		
28E		PIN4	J11		
28F		PIN5	J11		
28G		PIN6	J11		
28H		PIN7	J11		
28I		PIN8	J11		
28J		END	J12		
28K		PIN2	J12		
28L		PIN3	J12		
28M		PIN4	J12		

99/4H . . . from p. 9

resources but also the time for individualized computer instruction. But the 4-H group provides two full hours a week of individual computer time, with a student-tutor ratio of no more than three to one. Even in after-school computer clubs, teachers can seldom provide this kind of attention.

Ideal Classroom Situation

Rice compares the 4-H group to "the ideal classroom situation." Having taught school for 16 years, he knows the advantages of the 4-H learning situation. Besides the low student-tutor ratio, kids here enjoy a program that is "locked into individual needs rather than administratively-defined learning objectives." Kids work on 4-H projects not because they have to, but because they want to. In addition, they benefit from the real-world experience of people like Figg and Lee Galen, a parent volunteer who has worked in the data processing field for 20 years.

Eighteen-year-old Klaus Neubert, an unofficial project consultant for the 4-H group, is helping put together a dictionary to introduce kids to computer jargon and technical terms. Now a high school senior, he's already taken college courses in data processing. He says he was always a little bored with "teaching your dog how to walk" in other 4-H groups, but computers are something he is excited about. He's as comfortable with an Apple or a mainframe terminal as most people are with their television sets. And now he's getting acquainted with the TI-99/4A.

A Practical Approach

In good 4-H tradition, Figg and Rice are taking a practical approach to teaching computers. In the second session, they have kids type in a program that can be used to track a burgeoning brood of bunnies, including everything from number, sex and color to feed consumption and net profit. Kids who have used other computers at their schools need time to adjust to the idiosyncrasies of the TI-99/4A and unlearn some of the programming habits they've acquired on other machines. And through the tracking exercise, explains Figg, the children are not only getting acquainted with the keyboard, but picking up the meaning of INPUT, DATA and PRINT statements as well. They're also learning what Rice considers a most important lesson—that computers are useful tools that can be applied to many activities in everyday life.

The real-life emphasis is what distinguishes the 4-H program from school programs in computer literacy. In addition to learning practical applications from the start, the 4-H group takes frequent field trips to computer installations to mingle with professionals in the field. The group has already taken trips to mainframes at the University of Washington and toured the installation at the county courthouse. Other visits are planned for the future. Tips on how a leader can plan and carry out field trips like this will be included in leader manuals for computer projects. Offering this kind of information—something most schools have never provided—is an integral part of the 4-H philosophy.

Computers and Agriculture

Rice says the computer project actually has three goals: to develop users' skills (with emphasis on educational and agricultural software), to teach programming skills, and to provide an example for the agricultural community. "Sometimes I think what we're really into is selling the idea of computers," says Rice, who is hoping to have three computer stations, set up and operated by 4-H kids, at the county fair in August.

Rice hopes that by demonstrating the usefulness of computers at the fair, these kids will be able to draw farmers and rural people into a technology he considers more revolutionary than the invention of the wheel. Actually farmers already show a high degree of acceptance of the new technology. Their healthy survival instincts, honed through the Industrial Revolution, are now pushing them confidently into the microcomputer market.

Rice's enthusiasm for computers and agriculture is boundless. He sees the computer as a link eventually joining everyone from the professional dairyman and the university agricultural researcher, right down to the 12-year-old 4-H member raising rabbits in her back yard.

Continued on p. 70

WALLS AND BRIDGES

Gallant Knights Battle for Survival in the Epic of Feudal Wargames

FEATURING:

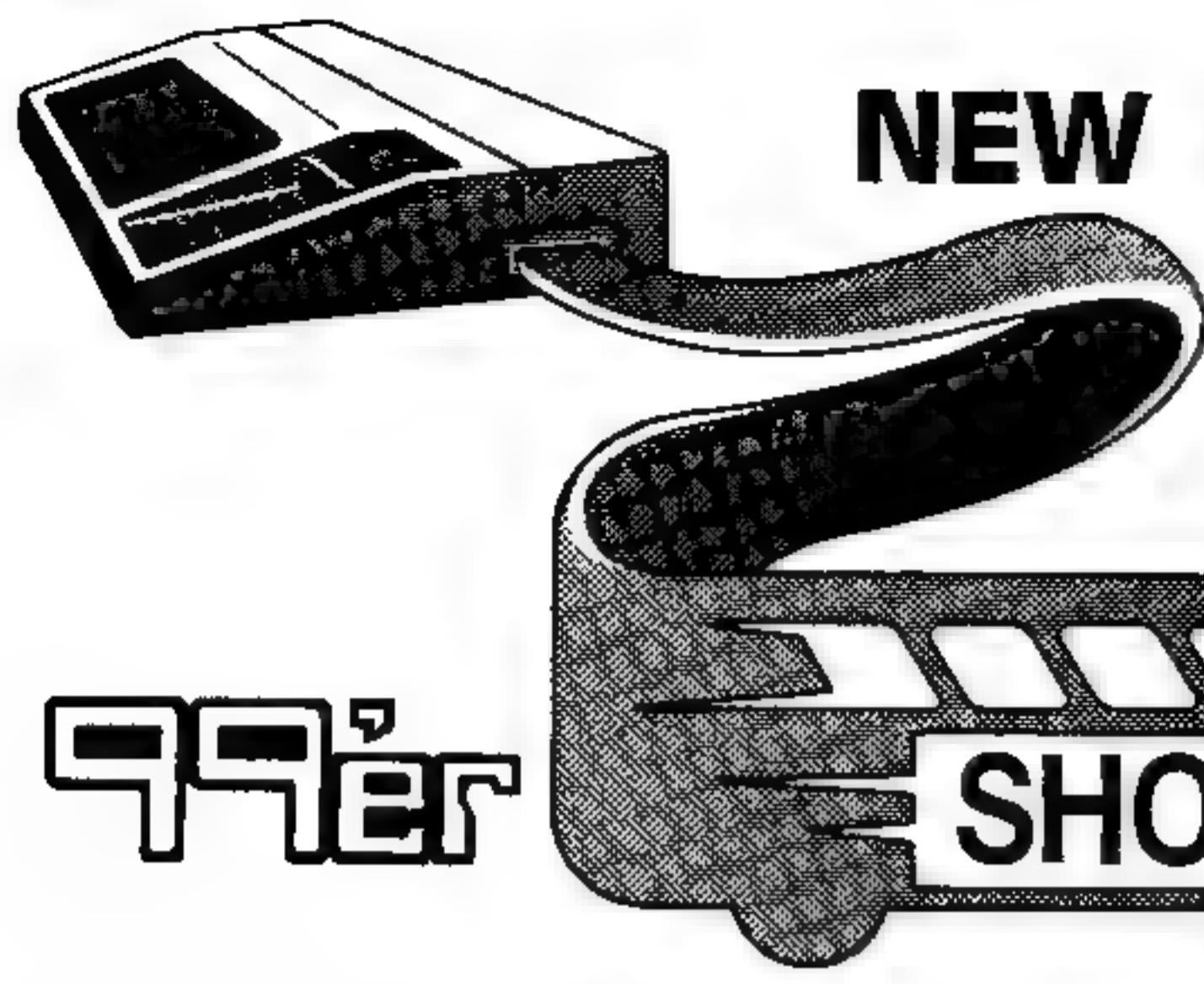
- Hi-Res Color Graphics and Sound Effects. This Program Comes Alive for One or Two Players.
- Cassette Tape [Requires only joysticks to Run]

ONLY 19.95 PPD.

FROM **TI-magination**
home computing specialists
P.O. BOX 2805
FAIRFIELD, CA
94533

ICA Residents Please add 6% Sales Tax

TI-99/4A * SCHEMATICS * HARDWARE * SOFTWARE		
*** SCHEMATICS ***		
Complete-up to date, includes pin-out of all ports, memory map & CRU address lists, timing & electrical data diagrams		
1) TI-99 4A	\$29.95	ALL 3 SETS
2) Peripheral Expansion Box	\$16.95	(SAVE \$11) \$45.85
3) Speech Synthesis Box	\$9.95	
*** HARDWARE ***		
**** PROTOTYPE DEVELOPMENT CARD (PDC)		
Interface YOUR designs to the 99 4A safely, easily PDC inc LED circuit a 10 buffers DSR EEPROM. Regulated + - 5V, + - 2V, 30 sq in vector board (100 centers), solder or wire-wrap.		
For use in Periph. Exp. Box	\$99.95	
Bare PDC (printed circuit) board	1/29.95	2/\$49.95
NO PERIPH. EXP. BOX? Use I/O CABLE ASS'Y (I/O CA) instead		
**** I/O CABLE ASSEMBLY (I/O CA)		
Alternative to P. Exp. Box		
For single peripheral (such as RS232 32K mem etc, Minus power supply (user provides + - 16V & 8V), With all needed power supplies	\$54.95	\$74.95
**** APPLIANCE CONTROL CARD (ACC)		
Run a home from your 99 4A Control wall switches & outlets, appliances, fans alarms, up to 500W/chan, 16 channels dimmer, uses Radio Shack PLUG N PWR remote units, uses house wiring		
Remote units (any type)	\$24.95	ACC as above
With built in REAL-TIME TIME-OF-DAY CLOCK		\$109.95
**** RELAY & DIGITAL OUTPUT CARD (RDOC)		
Four relays, 2 10A 250V, room for 4 additional relays plus 8-bits Latched TTL Data Out with Valid Data Signal Out		
For Periph. Exp. Box	\$89.95	For JOYSTICK port
\$64.95		
**** EXTENDED CARD (EC)		
Extends modules up above P. Exp. Box while they're functioning		
For Peripheral Expansion Box		\$49.95
*** SOFTWARE ***		
**** VIDEO CONCENTRATION I (cassette)		
Like T.V. game show, over 50 picture puzzles, 30 prize pairs Children's version		
	\$19.95	Regular version
\$39.95		
**** BINGO (with speech) (cassette)		
Six variations incl. BLACKOUT		
		\$29.95
**** COMPUTER DATING PARTY GAME (cassette)		
Find who should be with whom & who shouldn't		
		\$39.95
FORMORALL Applied Electronics Inc.		
800 S.W. Liberty Bell Dr., Beaverton, Ore. 97006		
1 503-645-0485 *Please allow 4-8 Wks*		
30 DAYS MONEY BACK IF SERVICED		



NEW PRODUCTS AND SERVICES

99'er

SHOPPING BUS

THE INDUSTRY'S LOWEST PRICED PRINTER

Alphacom has introduced what the company believes is the industry's lowest cost 40-column printer with graphics capabilities for home and personal computers.

The unit prints 2 lines per second and is priced at \$179.95. It is packaged in the same light-weight, impact-resistant Alphacom 42 enclosure that recently won an "Excellence of Design" award from *Industrial Design* magazine.

Alphacom has developed a cable interface approach that permits the same Alphacom 42 printer to be linked to most brands of home computers by simply using the appropriate interface cable.

Among the printer's features are upper and lower case letters, a wraparound facility that allows printing of text lines longer than 40 characters, and an ability to recognize standard ASCII control or action codes for changing the printing mode. Codes include carriage return, line feed, right justification, form feed, graphics control, and multi-line feed.

The Alphacom 42 printer at \$179.95 is ready for immediate shipment. Interface cables for the TI home computers are expected to be ready this quarter, 1983. Cable interface prices begin at \$29.95.

For further information, contact the Consumer Sales Department, Alphacom, Inc., 2323 South Bascom Avenue, Campbell, California 95008, (408)559-8000.

CORNER DRUGSTORE CONVENIENCE AND PRICES

Star Micronics, Inc. has introduced a "corner drugstore" ribbon replacement, an under-\$200 thermal printer, and an under-\$500 daisy-wheel printer.

The company has designed its Gemini-10 and Gemini-15 printers to use standard typewriter ribbon spools so that a customer will be able to replace a ribbon at the corner drugstore or an all-hours convenience store. The Gemini printers also feature additional fonts, larger built-in buffers, and removable tractor feeds with a wide range of adjustments. Suggested U.S. price for the Gemini-10 is \$399 and for the Gemini-15, \$645.

Star Micronics is also bringing out a new thermal printer peripheral for desktop personal computers with a suggested U.S. price of \$199. Features of the STX-80 include both bit-image and block graphics, European characters, and bidirectional, logic-seeking printing of 80-character lines (40 characters per line in expanded print modes) at 60 characters per second.

The Dallas company is announcing July, 1983, delivery of its daisy wheel printer at a suggested U.S. price of \$499, with details to be announced soon.

For more information, contact Star Micronics, Inc., 1120 Empire Central Place, Dallas, Texas 75247, (214)631-8560.

GRAPHIC DESIGN AIDS FOR THE TI-99/4A

TENEX™ Computer Marketing Systems, Inc. has developed two forms which aid the 99/4A programmer in graphics design. The Screen Graphics sheet (TNX 5300) divides the monitor screen into 32 columns and 24 rows, allowing simple layout and location of text and characters. Another scale divides the screen into 256 columns and 192 rows, so the more advanced programmer can easily define sprite coordinates.

A second sheet, the Character Definition graphics form (TNX 5400), displays a four-character by four-character matrix which can be used to define any graphic design, even the largest sprite. This form also contains a pixel-to-hex code conversion chart and space for writing program statements.

Each form is available in a 40-sheet pad for \$1.95 each from TENEX Computer Marketing Systems, Inc., Box 6578, South Bend, Indiana 46660, (219)277-7726.

COMPUTER CAMP FOR THE WHOLE FAMILY

Craig Hall Complex and the Texas Instruments Learning Center have joined forces to put together a unique Computer Camp for all ages in Chico, California this summer. The Computer Camp will offer classes for children ages 7-17, as well as computer literacy classes for adults. No prior computer experience is necessary to attend. The family is provided a unique opportunity to be introduced to the new world of the personal computer together, or the family can share a residence while the adults vacation and the students enjoy a computer camp atmosphere.

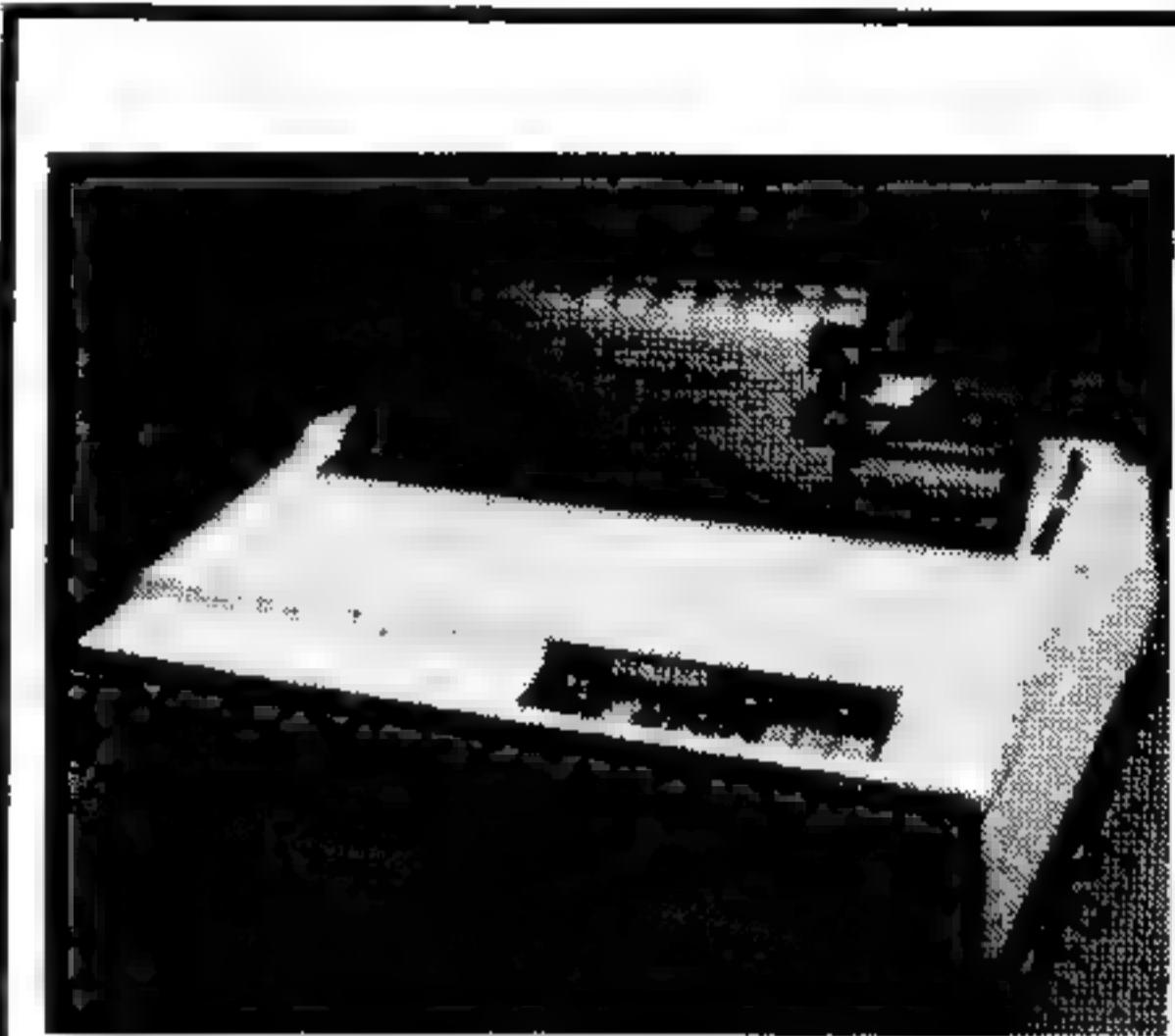
Texas Instruments' team of professional instructors and outside consultants will conduct all courses. Craig Hall will handle all the traditional aspects of the camp, providing the facilities, professional camp director, and counselors. The director and counselors are college-trained experts carefully screened for their knowledge and understanding of the various age groups. They will provide 24-hour, on-site supervision and conduct all traditional camp activities.

Craig Hall is an 850-bed student resident living facility, situated on an eleven acre site with full recreational facilities, including an Olympic sized swimming pool, tennis courts, volleyball, game rooms, and a TV lounge with a 6-ft TV screen. Three nutritious meals are served daily.

For more information, contact Mary Ann Perolio, CTC, Conference Coordinator, Craig Hall Computer Camp, 1400 West Third Street, Chico, California 95926, (916)345-1393 or Susan Michaels, Assistant Manager, Texas Instruments Learning Center, 5353 Betsy Ross Drive, Santa Clara, California 95054, (408)988-3481.

Send all Press Releases to:

99'er Shopping Bus
Attn: New Products Editor
1500 Valley River Dr., Suite 250
Eugene, OR 97401



COMREX DAISY-WHEEL PRINTER FOR PERSONAL COMPUTERS FOR UNDER \$700

The ComRite CR-II from Comrex retails for under \$700 and offers features usually found in more expensive printers—superscript, subscript, backspace, underline, boldface, double strike, and proportional spacing. The new printer also features a 5K buffer that allows a user to reproduce original and multiple copies of documents stored in its memory. The buffer can store up to three pages of data. The ComRite can be operated in a word-processing mode by simply selecting the Diablo 630 SPI protocol, available in most word-processing software.

The ComRite prints at an average speed of 12 characters per second; print motion is bidirectional and logic-seeking. Two standard interfaces are available: Centronics parallel and RS232C serial. Optional features include tractor feed, color print ribbons, a cut-sheet feeder, and interchangeable print wheels compatible with the Comrex CR-1 ComRite daisy-wheel printer.

In addition to its two daisy-wheel printers, Comrex markets a line of color and monochrome display monitors and will introduce several more input, output and storage peripherals for personal computer users this year.

For more information, contact Robert J. Pearce, Comrex International, Inc., 3701 Skypark Drive, Torrance, California 90505, (213)373-0280.

COMPUTER STANDS AND CASSETTE HOLDERS

CompServ offers a desktop computer stand of sturdy construction with a stained polyurethane finish. Weighing about 35 lbs., the stand provides room on top for a 13" TV and expansion box and room underneath for a computer console. The stand will also store up to 50 cassettes, modules, or computer manuals. The cost is \$25 plus shipping and handling.

CompServ also offers holders for 30 or 60 cassettes or 11 modules. The holders have sloped openings to keep cassettes or modules in place and can rest desktop or mounted on the wall. The 30-cassette holder costs \$25 including shipping and handling, the 60-cassette holder \$34 including shipping and handling.

For more information, contact CompServ, William J. Duffy, 812 Duffy Court, Matthews, North Carolina 28105, (704)847-0965.

For more information, contact CompServ, William J. Duffy, 812 Duffy Court, Matthews, North Carolina 28105, (704)847-0965.

FUTURA

SOFTWARE

*The very best in a totally integrated accounting system for your TI99/4A**

Accounts Payable	\$149.95
Accounts Receivable	\$149.95
Billing	\$149.95
General Ledger	\$149.95
Inventory Management	\$149.95
Mailing List	\$ 99.95
Word Processing	\$149.95

Exclusive Update Service insures against obsolescence of your FUTURA Software.

*Disk-based requiring Extended Basic, 32K Memory Expansion, RS232 interfaced printer

Coming Soon ***FUTURA POWER*** A step into the megabyte world with your 99/4A.

MONEY MANAGERS

Cassette programs in Extended Basic at \$49.95 each. Also available on diskette at \$54.95.

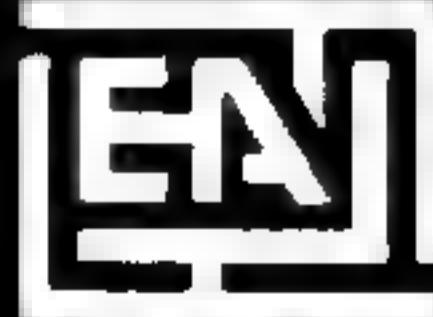
AMORTIZATION SCHEDULE*—Calculates and prints a mortgage payment schedule, given the loan amount, periodic interest rate, and the number of periods. Calculates the amount of interest, principal, and payment amount. Prints full or partial repayment schedules on call. *RS232 printer required.

NON-PROFIT ORGANIZATION INCOME AND EXPENSE REPORT—Provides an income and expense accounting system for a non-profit organization using a fund accounting system. Up to 100 income and expense categories can be defined and may be allocated to as many as ten different funds. In addition, maintains information on ten different bank accounts. Produces a monthly treasurer's report showing month-to-date and year-to-date figures for each of the funds, the ending balances of each fund and each bank account.

PERSONAL INCOME AND EXPENSE RECORD-KEEPING—Maintains income and expense data with up to ten different sources of income, ten bank account balances, 200 expense categories, and 50 credit card accounts. Expense accounts may be grouped into ten categories. Allows for automatic transfers of funds between bank accounts and charge accounts. Current balances, month- and year-to-date balances are available on call. A must for accurate budgeting and tax report preparation.

ORDERING INFORMATION: Payment to accompany order. Add \$1.50 for postage. Allow 10 days for delivery.

Write for complete listing of more than 60 programs for the TI99/4A Computer.



Ehninger Associates, Inc.

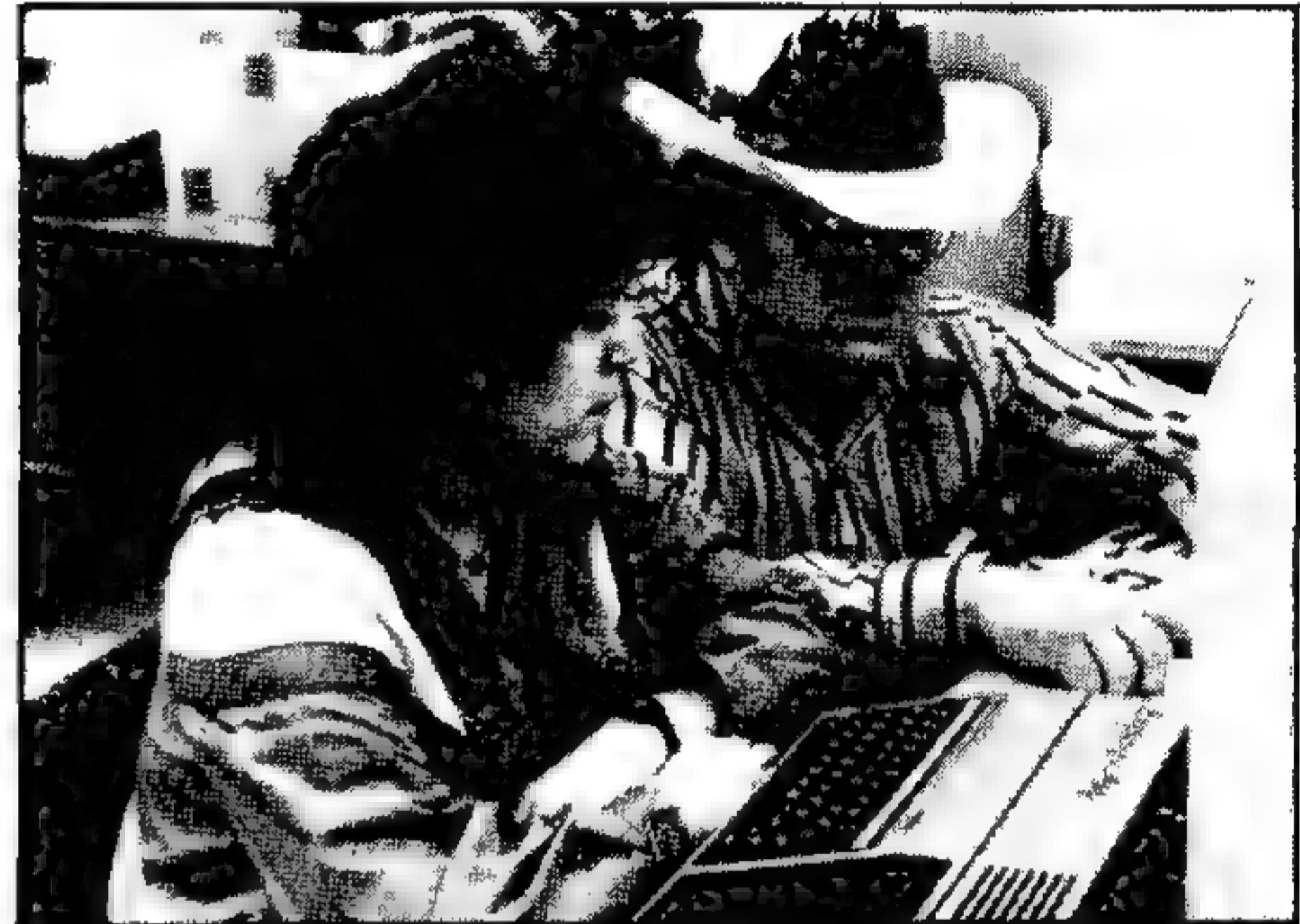
P.O. Box 5581

Fort Worth, Texas 76108

817/246-6536

99/4-H . . . from p. 68

Although county agents are already part of a large agricultural computer network, individual 4-H groups don't have that kind of access yet. But Rice envisions an eventual computer network/data base focusing on the many common interests of the agricultural community—crop rotations, fruit tree spraying schedules, fertilization techniques and, of course, educational activities for children.



Lee Galen, with 20 years of data processing experience, enjoys sharing some of his computer expertise with 14-year-old Lydia Venegas. Using the school district's computers, 4-H group leaders are able to provide kids with quality one-on-one programming instruction.

Time, Money and Expertise

Some 4-H clubs are beginning to use computers on a small scale to help organize the flood of data involved in their day-to-day management. Ginger Holser, a 4-H leader in Snohomish County, is using a computer to keep track of horse-judging scores. As computers become increasingly available to 4-H leaders, they'll be finding more and more of these practical applications.

Computers, 4-H and agriculture have a real future together. But lack of money is a big deterrent to the development of their interests in common; 4-H programs are supported only partially by federal funds, allocated by the state. Little money is available for project development and even less for the purchase of equipment. Figg and Rice are exploring the possibilities of funding through special grants and writing to local businesses for contributions.

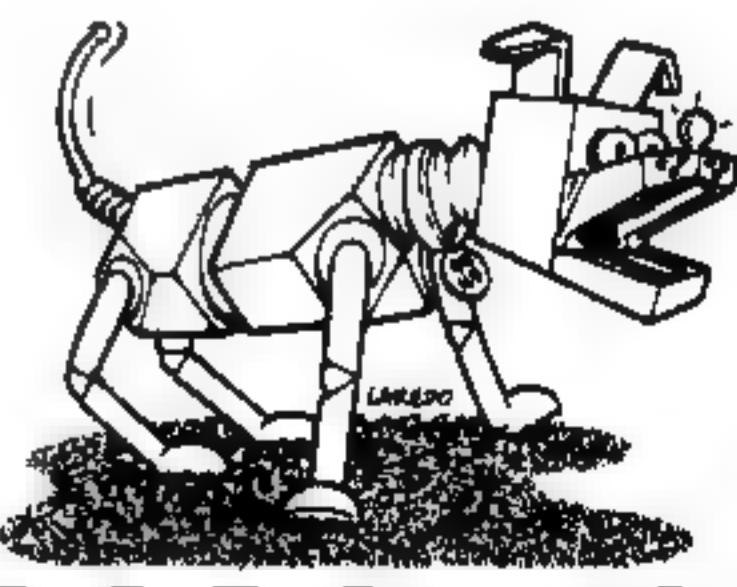
A lack of qualified leaders is also a problem. Although Rice's group is more than adequately staffed, in Marysville (25 miles to the north) there are kids who want to learn and computers to learn on, but no qualified volunteers to teach.

Providing a whole generation of children with computer literacy and training for a computer-based society is a big job that schools, so far, aren't able to handle without help. The 4-H, with its limited resources, can't do it alone either. But as more and more organizations gain access to computer equipment and programming skills, we can expect to see the job increasingly shared by all segments of society. As this happens, we will begin to see that the computer, long feared as an isolating force in our society, can instead serve to draw us together in common goals and bridge communications gaps between us.

SP/100

* (Best Article—Reader's Choice)

Let us know what you like by voting for your favorite article or program in this month's 99'er Home Computer Magazine. Fill out the removable B.A.R.C. BACK response card on the bottom of the 99'er Questionnaire and mail it in. (There is no need to fill in the 99'er Questionnaire again, if you have already done so.) Let your voice be heard—the winning author will receive a bonus of \$100.00!



B.A.R.C. BACK

SUPER CATALOGER™ "THE" TI-99/4(A) SOLUTION TO MANAGING YOUR DISKS

"I found the *Super Cataloger*™ a welcome addition to my library of program utilities. The product is **easy to use** right from the beginning. Additionally, the printed report format is **accurate, very readable, and extremely useful**. If you have a disk system, printer, Memory Expansion and Extended BASIC, you probably won't want to be without this *Super Cataloger*™."

— 99'er Magazine (March '83, page 21)

ORDER NOW

Call (703) 820-4131 for immediate shipment with billing for \$34.95 or C.O.D. for \$32.95 or send check or money order for \$29.95 to

J & K H SOFTWARE (Dept. E)
2820 S. Abingdon St., Arlington, VA 22206
Virginia residents add 4% sales tax

SUPER CATALOGER™ — MULTI-DISK CATALOG PROGRAM
created by Larry Hughes with graphics and assembly language enhancements by Jim Holender

15 DAY MONEY BACK GUARANTEE

ARRO-SOFT SYSTEMS
Quality Soft Ware for the TI 99/4A Computer

BIORHYTHM
Use your biorhythm cycles to pinpoint the best days for important decisions in your life! Biorhythm theory states that from birth each of us is influenced by three internal cycles: a physical cycle (23 days), an emotional cycle (28 days) and an intellectual cycle (33 days). If the relative position of cycles with respect to each other influences daily behavior. When a cycle (sine wave) crosses the center axis this is called a critical day. Use Arro-Soft's program to plot your biorhythms. It can also be used to correlate the biorhythms of historical characters.

In TI basic. Requires only TI 99/4A, CRT and cassette recorder. Printer optional. \$24.95

ARRO-SOFT SYSTEMS
P.O. BOX 1761 EDMOND, OK 73083

Send for catalog of available programs

TEXAS SOFTWARE DESIGN

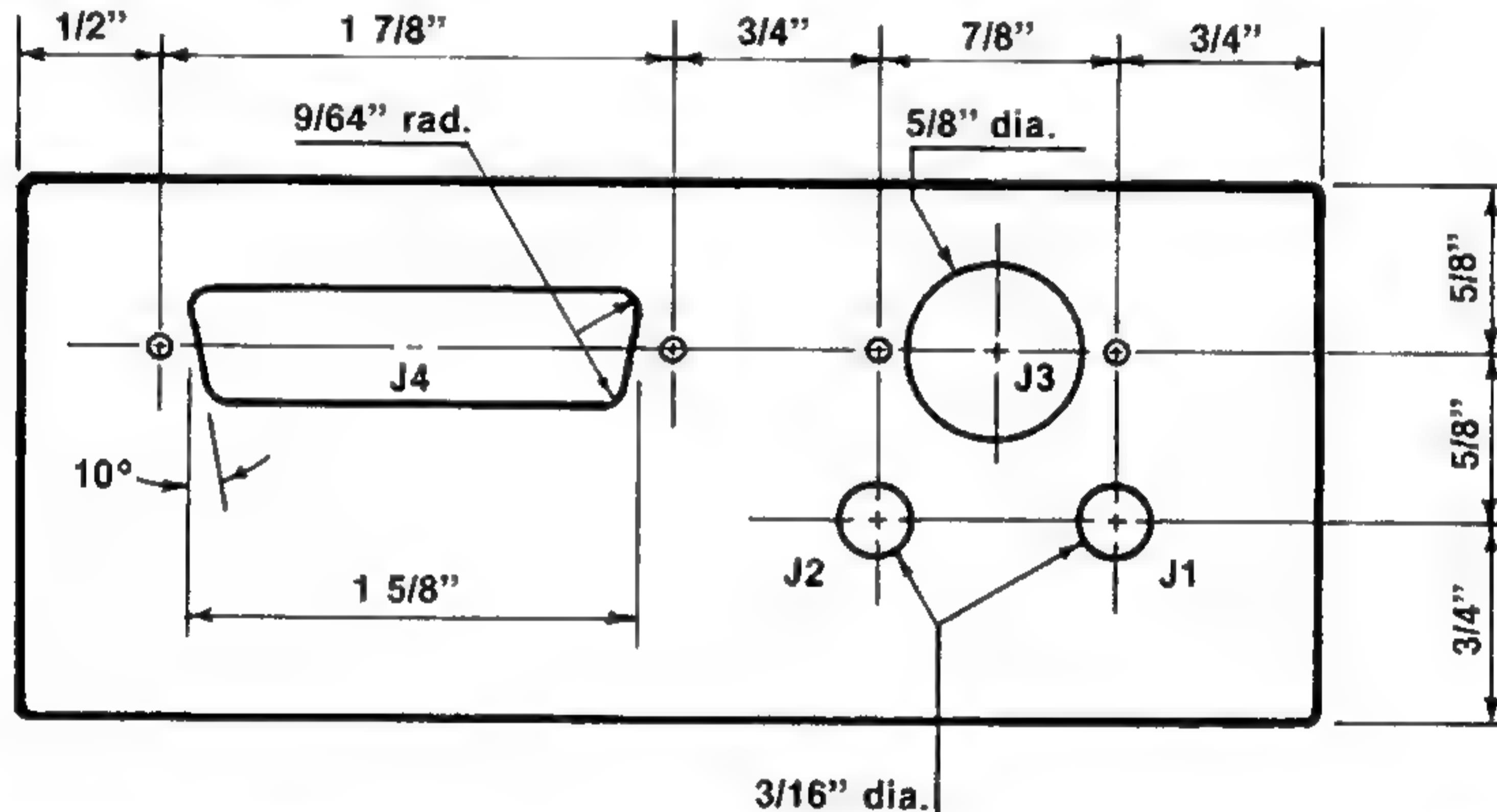
We specialize in BASIC/Extended BASIC cassette programs for the 99/4A Computer.

EXPERIENCE THE FUN
AND EXCITEMENT OF:
STRATEGY AND ACTION GAMES
PUZZLING TEXT ADVENTURES
GRAPHIC & SOUND ENTERTAINMENT

For a free program catalog, send a self-addressed stamped envelope to:

TEXAS SOFTWARE DESIGN
4000 Tompkins Drive
Baytown, Texas 77521

JoyTalk . . . from p. 67



BACK PLATE DRILLING TEMPLATE

Straight Flush . . . from p. 23

game to a crawl. For these reasons, we recommend that *Challenge Poker* be played alone.

What's the Score?

At first, deciphering the score was as much a challenge as playing the poker part of the game. After a bit of figuring, however, the system became clear. Each row and column is represented to the right of the game board by its corresponding letters and numbers. The two diagonal scoring possibilities are indicated also (under short diagonal lines). Under the appropriate column/row symbol you will find your scores for each "hand" on the gameboard. The computer enters the separate scores for the on going subtotals (ST) and the total point score (TOT) for all rounds below the column/row scores. The screen also keeps the message PLACE CARD, [Joe or Mary] on at all times. This lets you know immediately whose turn it is,

eliminating the confusion that could result from the multiple game boards.

Playing Ease

It may take a while before you get into the triple digit scores, but *Challenge Poker* is an easy game to learn. The documentation is easy to understand, covering everything from loading (a modicum of loading know-how is assumed) to scoring and ending the game. The directions fail to mention one important point, however: In order for the program to run, you must either use a minimal system, or type in CALL FILES (1) prior to loading the program. If you don't, you will get a MEMORY FULL message instead of a game. Also, I personally would have appreciated a handy definition list of Poker terms, but most game players probably already know what a straight, flush and full house are (they can also be found in the dictionary). Errors are not a problem with this game. If you make a mistake in enter-

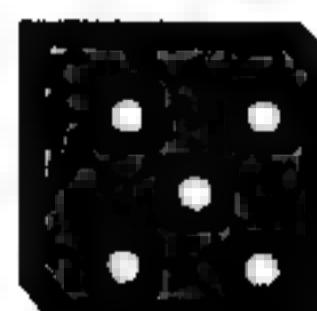
ing your row or column number, you simply key it in again; nothing is final until you press ENTER.

Challenge Poker is not a game in which graphics take center stage, but the visual effects are bright and easy to understand. The game board is well designed with colorful, clear card faces and scores prominently displayed. There is also a nice victory tune when you complete a "winning row," and it plays twice if you score in two directions at once.

So if you are looking for a solo game that is long on strategy and short on bells, lights and buzzers, *Challenge Poker* may be your game. If you are looking for a game to sharpen your Poker-playing skills in the privacy of your own home, it is definitely your game. You won't need to round up a foursome, and you can bluff (or cheat) to your heart's content. But remember the old adage: The man who cheats at Solitaire has a chump for an opponent.

Pewterware PRESENTS

ROLL FIVE



This is an old favorite for one to four players. Save the dice of your choice on each of three rolls. Roll five of a kind and score the highest.

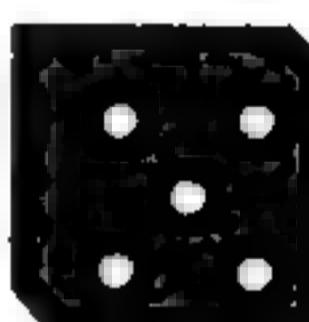
Game includes music and amusing comments after each turn. (Basic) Cassette ...\$14.95

FREE GAME

This is a one-time offer for 89/4A users to introduce the outstanding game programs available from Pewterware such as:

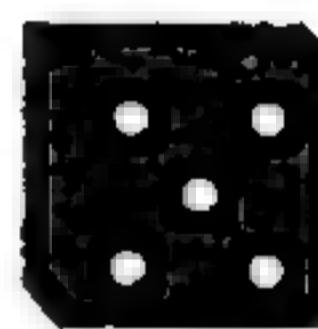
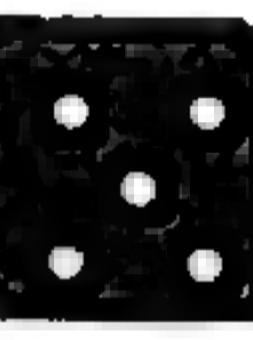
- Bluegrass Sweepstakes
- Match Wits
- Challenge Poker
- Decathlon
- Up Periscope (x-basic)

On cassette — \$14.95 each buy any program at the regular price and receive your second game for free!



Check
Money Order
VISA/Mastercard

Pewterware
P.O. Box 503
Gulf Breeze, FL
32561



TITAN SOFTWARE

PRESENTS

GOPHER

Can you help the Gopher move through the ever changing maze, racking up as many points as possible as you do. A superior fast action game for 1 or 2 players that fully utilizes the speed and graphics of TI's extended basic. Joysticks optional (but recommended).

SPECIAL INTRODUCTORY OFFER
Beat our high score in Gopher and win another game from our catalogue **FREE**
* (Photo of screen as proof) *

* * * * * * * * * * * * *
You can also test your skills with the following

VIDE-O-THELLO: The classic game of strategy derived from the ancient game of GO. For 1 or 2 players with 'Help' mode and many skill levels and options. (xbasic c).

BRAINTWISTERS I: A 3 pack of games to test your powers of logic to the fullest, magic square (xbasic only), switchboard & decoder (basic or xbasic).
BRAINTWISTERS II: 2 more games to drive you crazy. Solitaire and Echo (basic or xbasic).

AND OTHERS: Write for a free brochure.

All games are available on cassette for the 4A and cost \$15.95 each (\$19.95 Canadian; Ont. residents add 7% sales tax). Add \$1.50 per order P & P. Money order, certified cheques, Visa or Mastercard (give card # exp. date). Personal cheques add 4-6 weeks. No C.O.D.'s.

TITAN SOFTWARE
1382 FORDON AVE.,
PICKERING, ONT. L1W 1J9

COMPUTER BASF CASSETTES / -DPS



THE WORLD'S FINEST

- Data media for all microcomputers
- Used nationwide by software manufacturers, hobbyists, schools and businesses
- Premium 5-screw shell with leader fits all standard recorders

CASSETTE STORAGE CADDY

NEW!

ORGANIZE YOUR TAPES!

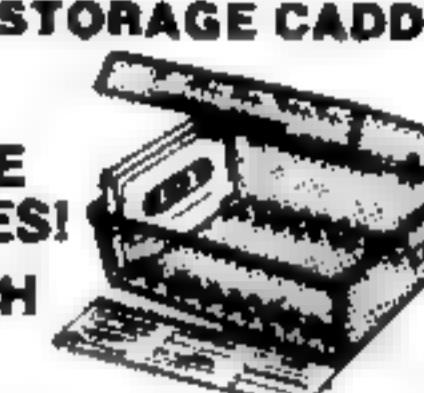
\$2.95 EACH

GET ONE

CADDY FREE!

Buy 2 doz. Cassettes & One Caddy. Get One Caddy FREE!

OFFER EXPIRES AUGUST 1, 1983



- SATISFACTION GUARANTEED OR YOUR MONEY BACK.
- FOR IMMEDIATE SHIPMENT USE YOUR VISA OR MASTERCARD

CALL 213/710-1430

ORDER FORM

ORDER NOW... MAIL TO: YORK 10 Computerware

24573 Kittridge St., #99 Canoga Park, CA 91307

ITEM	1 DOZEN	2 DOZEN	TOTAL
C-05	7.50	15.00	
C-10	8.00	16.00	
C-20	10.00	20.00	
Hand Box	2.50	5.00	
Storage Caddy \$2.95 ea. Quantity			
\$2.95 ea. Quantity			
Blank Labels 400/1000	30.00	1000	
SUB TOTAL			
Cass. (standard add 5% sales tax)			
Shipping/Handling 1 doz \$2.25 doz \$3.50			
3 doz \$4.50 each additional doz \$1.50			
For Parcel Post instead of UPS ADD \$1			
Outside Continental USA ADD \$2			
TOTAL			
Check or M.O. Charge to Credit Card enclosed <input type="checkbox"/> VISA <input type="checkbox"/> MASTERCARD			
• PLEASE SEND QUANTITY DISCOUNTS			

Name _____

Address _____

City _____

State/Zip _____

Card No. _____

Exp. _____

Signature _____

vertical straight lines, you can hack around the problem by designing a horizontal or vertical character on tiles and then using a PUTTILE command inside a recursive program with appropriate stop rules. For example:

```
TO LINE :X :Y
IF :X > 30 STOP ;or change X back to
0 and increment Y
PT 255 :X :Y
LINE :X + 1 :Y
END
```

It may seem strange to start talking about LOGO III while waiting for an outstanding LOGO II, but by its very nature as a growing procedural language, LOGO invites improvements. In three or four more years LOGO III may be at our disposal, using the voice synthesizer or even LISTENing to spoken commands. It may have floating point arithmetic* or expanded turtle graphics. I am encouraged that TI did not simply sell the original LOGO until it had exhausted the market, but instead pursued the improved LOGO II. As soon as I returned from TCEA, I increased my order (placed last November) from 12 to 15 Command Cartridges.

Sincerely,
Henry Gorman, Jr.

* Roger Kirchner argues that this is not necessary and he has a program which allows for floating point in the original LOGO

NOW PLAYING

ZOMBIE MAMBO



Your most dreaded NIGHTMARES
have become REALITY as you
search for the treasure of
the SORCERER'S CRYPT!

A Fantastic Array of Color Graphics and Sound Effects
Combine with a Superbly Crafted Adventure Theme
to Bring You a Truly Unique New Game!

• Requires Only Joysticks to Run (Programmed
Entirely in Basic)

• DOUBLE FEATURE: Two-Program Cassette Tape
(The Cemetery/The Tomb)

ONLY \$22.95 PPD.

(CA Residents Please add 6% Sales Tax)
ANOTHER CLASSIC FROM

TImagination
home computing specialists

P.O. BOX 2805, FAIRFIELD, CA 94533

EXTRA SPECIAL OFFER
Get ZOMBIE MAMBO
and WALLS AND BRIDGES
(Total Value \$42.90)
-All Three Adventures-
For Only 29.95 PPD.



PEGASUS SOFTWARE

Quality Software for your TI-99/4(A)

NEW

ARON'S REVENGE

Sequel to **Quest For The Sword**. Text adventure. Slay the dragon with the sword of Aron and save the kingdom.

basic \$17.95



ALSO SIEGE
Experience conflict between a medieval castle and attacking forces in this 2 player graphical strategy game. **xbasic \$17.95**

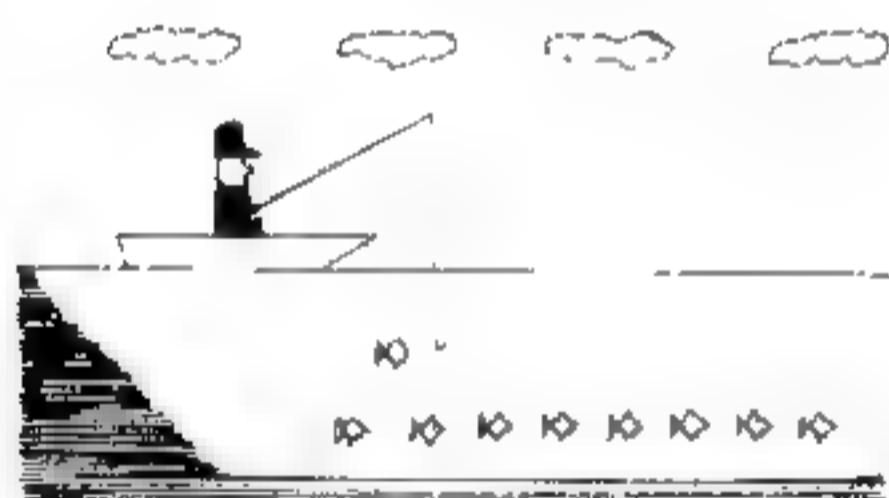
Send SSA for Catalog

PPd. Send check or money order to:

PEGASUS SOFTWARE
1438 38th Avenue
Greeley, CO 80634

OPEN THE DOOR FOR SPECIAL LEARNERS

Software Programs Designed and Field Tested by a Rehabilitation Expert.



FUN PROGRAMS THAT START WITH THE BASICS

- COUNTING • ARITHMETIC
- SPELLING
- WORD RECOGNITION

A hands on experience designed especially for slow learners, encouraging family involvement.

FREE BROCHURE AVAILABLE
WRITE OR CALL:

THE UPPER ROOM

907 6th Avenue East
Menomonie, WI 54751
715-235-5775

PROGRAMS FOR KIDS

KIDware specializes in low-cost, educational game programs for children. Colorful graphics and music are part of all our programs and every program is KID-tested. Some of our best selling TI BASIC programs are:

K001 HANGMAN A classic with nearly 400 words
K002-ZIGGY BALL Ping pong fun with the joysticks

K003-NUMBERS I Preschool number games
K007 MAGDONALD'S FARM Help the farmer find his runaway animals

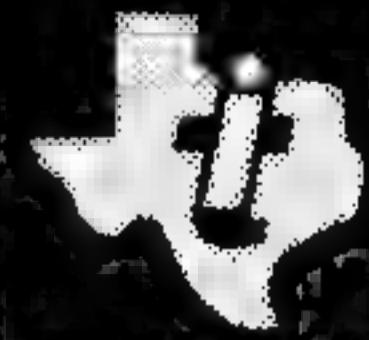
K009-TIC-TAC-TOE You against the computer

Write for a complete program list. Our low price is just \$10.95 for any TWO programs on cassette tape. To order, specify programs desired and send check or money order (no shipping charges Idaho residents add 4% sales tax) to:

KIDware
PO Box 1664
Idaho Falls, Idaho 83401

KIDware appreciates your business

CRAIG HALL
IN CONJUNCTION WITH
The Texas Instruments
Learning Center™
OFFERS A SUMMER OF FUN
AND COMPUTER EDUCATION.



The powerful, versatile computer languages of TI Logo and Basic are used as building blocks in this week-long CAMP of fun and adventure. Includes formal classroom instruction as well as supervised computer practice time provided by the Texas Instruments Learning Center Staff.

FAMILY PACKAGES AND COED CAMPS FOR AGES 7-16

- The FIRST California FAMILY Computer Camp.
- Flexible Family Accommodation Rates.
- Professional Camp Director and Counselors.
- Residential Style Housing with Private Bath.
- Week-long sessions begin June 11 to Aug. 12, 1983.
- Only \$495.00 per Child Camper.
- Conveniently located in beautiful Chico, CA.
- Families can enjoy the rare regional scenic beauty.
- SPECIAL ACTIVITY: GOLD PANNING EXPEDITION.

FOR FURTHER INFORMATION CALL OR WRITE:
Craig Hall Computer Camp • The Texas Instruments
Conference Coordinator • Learning Center
1400 W. Third Street • 5353 Valley Ross Drive
Chico, CA 95928 • Santa Clara, CA 95054
916-345-1303 • 408-906-3481

Eight Easy Pieces ... from p. 60

Despite these flaws, the programs are geared to be extremely easy to use and yet provide more difficult levels once a task has been mastered. *Early Counting Fun* "graduates" can move on to *Shark Counting* or *Fish and Count*. Those who tire of *Keyboard Trainer* can progress to *The Talking Typewriter*, a more interesting game in which the Speech Synthesizer pronounces letters, words and whole sentences that the child keys in. While I am not sure exactly how long this game will occupy a child's interest, I can say that it managed to occupy several editors in this office for a good part of the afternoon.

What Does It Teach?

The exercises in this package concentrate on the most basic skills—letter and number recognition, counting, addition and subtraction. In *Count and Fish*, there is an *automatic mode* in which a child simply learns to operate the joystick. Children can progress from matching letters on the screen with letters on the keyboard, to writing full sentences in *The Talking Typewriter*. It should be noted, however, that an exercise such as *The Talking Typewriter*—in which the Speech Synthesizer merely reads whatever letters or words are fed in—does not really teach anything more than letter recognition. Students must already know how to spell the words they key in. (The program will not correct spelling errors.) It should also be explained to them that sometimes the computer has a slight "speech impediment" and may pronounce words (even correctly spelled ones) a bit strangely.

The Talking Typewriter would be more effective if there were a feature—which we have seen in other programs of this type—whereby the pronunciation could be corrected by spelling in difficult-to-pronounce words phonetically (then linking the phonetic pronunciation with the correct spelling). This way a Sean or Phoebe could have the pleasure of hearing their names pronounced correctly when they are

spelled in. With proper encouragement and support, this program can provide a strong incentive for students to compose words and sentences.

The skills that these programs focus on are of the most essential sort; the skills children must master if they are to move on. *Upper Room* is also planning to introduce software that will cover such skills as color recognition, directions and prepositions (up, down, over, under, etc.) sometime in the future.

Is It Simple to Use?

Although the documentation for these programs is quite extensive, we found it somewhat unclear and difficult to use. Instead of presenting the pertinent information—language, program name, equipment needed—clearly at the beginning the directions for each module have to be read in full. Also, the introduction states that the programs can be run in either BASIC or Extended BASIC. We found, however, that the program for *Keyboard Trainer* works only in Extended BASIC. The documentation is complete, but it's not easy to use. Teachers and parents will quickly tire of hunting through several paragraphs to find the program name for loading. There should be a fast and easy way for parents or teachers to change to a new program as soon as Wendy or Billy starts to get bored.

There are other features in both the documentation and the programs themselves that are unclear: In *Talking Typewriter* you can ERASE or change a word only while you are in the process of writing it. The instructions do not explain this. In *Fish and Count* it is the fish who must hook himself on the fishhook, rather than vice versa—an unexpected and somewhat illogical scenario.

The order of the directions in this program also seems backwards. When the question DO YOU WANT THE SPEECH OPTION TURNED ON (N) appears, the inclination is to respond to the prompt immediately. If

Index to Advertisers

A/D Electronics	26	NSY Software	30
AJ International	28	Navarone Industries	64
Alpha Software	34	Northern Light Software	52
Alpha II Computer Services	32	Norton Software	12
Arro-Soft Systems	71	Not Polyoptics	55
Ayers Computer Products	32	Parallel Systems, Inc.	20
Bach	40	Pegasus Software	74
BeeJay Funware	36	Pewterware	72
Best Software	27	Prometheus Software	59
Cintronics	63	Republic Software	23
CompuTech Distributing, Inc.	44, 45	Richard, Harry P.	31
Computer Connection I	27	Root Assoc., C.A.	20
Computertronics	46	Ruth, Co., M.W.	23
Computer-Ed.	27	SA2 Software	49
Computer Peripheral Resources	27	SAVE, Inc.	54
Computer Peripherals Unlimited	26	S & S Software	46
Cumberland Technology	66	Scotch Marketing Inc.	51
Datart Software	34	Shenango Enterprises	32
Data Soft, Inc.	61	Softies, The	14
Decision-Making Systems, LTD	46	Software International	14
Dollard, Walter J.	31	Software Support	48
Doryt Systems, Inc.	14	Space Age Technology, Inc.	47
Dow, John T.	26, 61	Specialty Services Co.	47
Dynamic Data & Devices	40	Star Micronics	66
Eastbench Software Products	52	Sunrise Software	79
Eckhaus, M.K.	67	TENEX	47
Epson America, Inc.	10, 11	Texas Software Design Co.	42
Extended Software Co.	15	Textiger	49
FFF Software	61	Texas Instruments, Inc.	18, 19, 80
Fantasia '99 Software	40	TImagination	68, 73
Foundation	29	Titan Software	72
Formorall	68	Unisource Electronics, Inc.	49
Fox Valley Software	20	Upper Room, The	74
Futura Software	70	VID-COM	27
Hall, Craig	74	Welcom Software	67
Harvey, James	30	Western Micro Systems	64
I & I Computer Programming LTD	31	Wycove Systems Limited	47
Intersoft	46	York 10 Computerware	72
J & K H Software	71	99/4(A) Program Exchange	36
Jerseyware Microcomputer Software	26	99'er Bookstore	41
KIDware	74	99'er Home Computer Magazine	56, 76
Leading Edge Products, Inc.	2	99'er-ware	77, 78
Luv-Tronics	40		
MECA, Inc.	47		
Memory Devices	17		
Micronova 99	46		
Microworld	30		
Micro-Ed, Inc.	66		
Micro-80 Inc.	67		
Midwest Technical Assoc, Inc.	14		
Millers Graphics	33		
Mirage Software	34		
Moonbeam Software	3		
Music Workshop	47		
MYARC, Inc.	52		

99'er Buyers Guide*

Bach Company, The	40-E, 40-F
Canadian Micro Works	40-D
Dheins True Value	40-C
Elek-Tek, Inc.	40-B
Keystone Distributing Co.	40-A
Microcomputers Corp.	40-E
SAVE	40-F
Soft City of Michigan	40-D
Tex-Comp Users Supply Division	40-G, 40-H
Unisource Electronics, Inc.	40-F
99'er-ware	40-D, 40-E

*99'er Buyers Guide found only in subscript on copies

you respond N you can continue, but if you answer Y you find out you must already have the Extended BASIC cartridge or the Speech Editor (as well as the Speech Synthesizer) plugged into the console. The on-screen directions remind you of this, but too late. Most of us will have already started running the program in BASIC and will then have to stop to take time to hunt up the necessary cartridge and reload the program. The first time this happens it may be just a minor inconvenience, but there are more than a few opportunities for this to happen again. Also, we could use some reminders, like, "Is your ALPHA LOCK key up?" No one enjoys fumbling around, wondering why the program isn't working.

Because of such "hard-to-figure" features, it is not likely that the children will be able to run these programs themselves (once they have been loaded in) until they have been through them with their teacher a few times. We also found that there are times when you have to hold the key down a long time in order to get the computer to respond. To answer the question, "Is it simple for the teacher to

use?" we would have to answer: Only for a patient soul who is willing to read lots of instructions. In answer to "Is it simple for the children to use" we say—Yes . . . with supervision.

Is It Worth the Money?

The package of eight programs, which comes with a three-ring binder of instructions, sells for \$154.65. Individual (tape or diskette) programs are also available at prices ranging from \$14.95 to \$29.95. A quick perusal of the educational software market reveals that there's not much to compare these with. I'll leave the judgment as to the value of these programs up to you. As for me, I feel them to be a little expensive.

Does It Use the Computer?

This software gets high marks in taking advantage of the computer's capabilities. All of the programs allow the option of using the Speech Synthesizer. *Fish and Count* lets students use the joystick to catch the fish they have counted. Most of the programs also make extensive use of

the computer's color graphics, animation and sound capabilities.

One of the most valuable aspects of Computer-Assisted Instruction is student-computer interaction. The computer's ability to respond to the student's work is probably its most valuable feature. These programs provide a wide variety of responses. While we would have liked a bit more positive reinforcement, students always know if they are right or wrong. The programs that incorporate the drills into game formats are especially effective.

Sweet Success

Most important, the content of these programs is designed to be simple enough for handicapped students to understand, challenging and varied enough to keep students from getting bored, and finally, easy enough that students can eventually master them. This last quality is a crucial one. The experience of mastering a drill or a game is a new one for many handicapped students, and we all know that success can do wonderful things for motivation, self-esteem, and performance.

Keep Your Magazines & Tapes Together With a

99'er® FINDER-BINDER™



*Only \$10.95 without cassettes, plus \$1.00 shipping & handling.
6 High-Quality 99'er-ware C-10 Digital Computer Cassettes
(with special BASF tape and 3-screw housing for data integrity)
Available separately for \$7.00 plus \$2.00 shipping & handling.

□ SPECIAL: 99'er Finder-Binder that is packed:

- with 6 of the above blank cassettes for only \$16.95.
- with 12 of the above blank cassettes for only \$21.95.
Add \$1.00 shipping & handling to either order.

DUST COVERS

Features:

- Equipment Protection
- Handsome Appearance
- Custom-Fit
- Antistatic Treated
- Quality Construction



The TEX-SETTE™ Adapter Cassette Compatibility At Last!

If The TI-99/4A Will Not Control Your Cassette Recorder Through Its Remote Jack, We Have The Solution For You...



- Low cost — Only **\$5.95** plus \$1.00 each for postage and handling.

A	10" Color Monitor Cover	\$10.95
	13" Color Monitor Cover	\$12.95
	(not shown)	
B	Peripheral Expansion Box Cover	\$12.95
C	TI's 99/4 Matrix Printer Cover	\$9.95
	(same as Epson MX-80 Cover)	
D	Cassette Recorder Cover	\$4.95
	(1 size fits up to 10" x 6")	
E	TI-99/4(A) Console Cover	\$6.95
F	Speech Synthesizer Cover	\$3.95
G	Peripheral Box Cover	\$5.95
	(Specify: 32K Memory Expansion, RS232 Interface, or Disk Controller)	
H	Thermal Printer Cover	\$6.95
I	Disk Memory Drive Cover	\$5.95

DEALER
INQUIRIES
INVITED

Add \$2.00 shipping/handling for the first dustcover; 50 cents for each additional cover.

99'er-WARE™

P.O. Box 5537
Eugene, Oregon 97405
Tel. (503) 485-8796

WHEN PEOPLE BUY A
TEXAS INSTRUMENTS
HOME COMPUTER
FOR UNDER
\$100...

\$100.00



**...THEY'LL SELECT
WORLD-CLASS SOFTWARESM
FOR UNDER \$10**

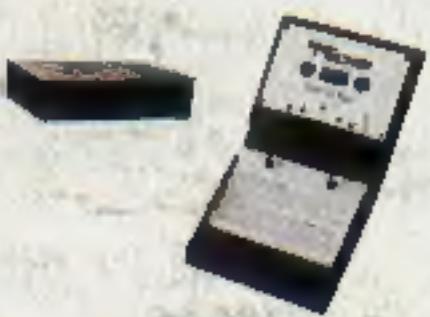
THEY'LL SELECT

**IN EACH 99'er-PAK™ TI USERS
RECEIVE TRIPLE THE VALUE:**

- **A Quality Game, Instructional Program, or Utility on Cassette**
- **A Flip-Card Book that Explains the Software, PLUS Teaches Beginners a Lesson in Computer Programming**
- **A Durable & Attractive Ring-Binder Collector's Case**

EMERALD VALLEY PUBLISHING CO.
1500 Valley River Drive, Eugene, OR 97401 Tel. (503) 485-8796

ASK FOR IT FROM YOUR FAVORITE
DEALER, IF HE DOESN'T HAVE IT YET.
—ASK WHY!—



Don't let price get in the way of owning a quality printer.

Adding a printer to your computer makes sense. But deciding which printer to add can be tricky. Do you settle for a printer with limited functions and an inexpensive price tag or buy a more versatile printer that costs more than your computer? Neither choice makes sense.

Here's a refreshing option—the new, compact STX-80 printer from Star Micronics. It's the under-\$200 printer that's whisper-quiet, prints 60 cps and is ready to run with most popular personal computers.

The STX-80 has deluxe features you would

expect in higher priced models. It prints a full 80 columns of crisp, attractive characters with true descenders, foreign language characters and special symbols. It offers both finely detailed dot-addressable graphics and block graphics.

And, of course, the STX-80 comes with Star Micronics' 180 day warranty (90 days on the print element).

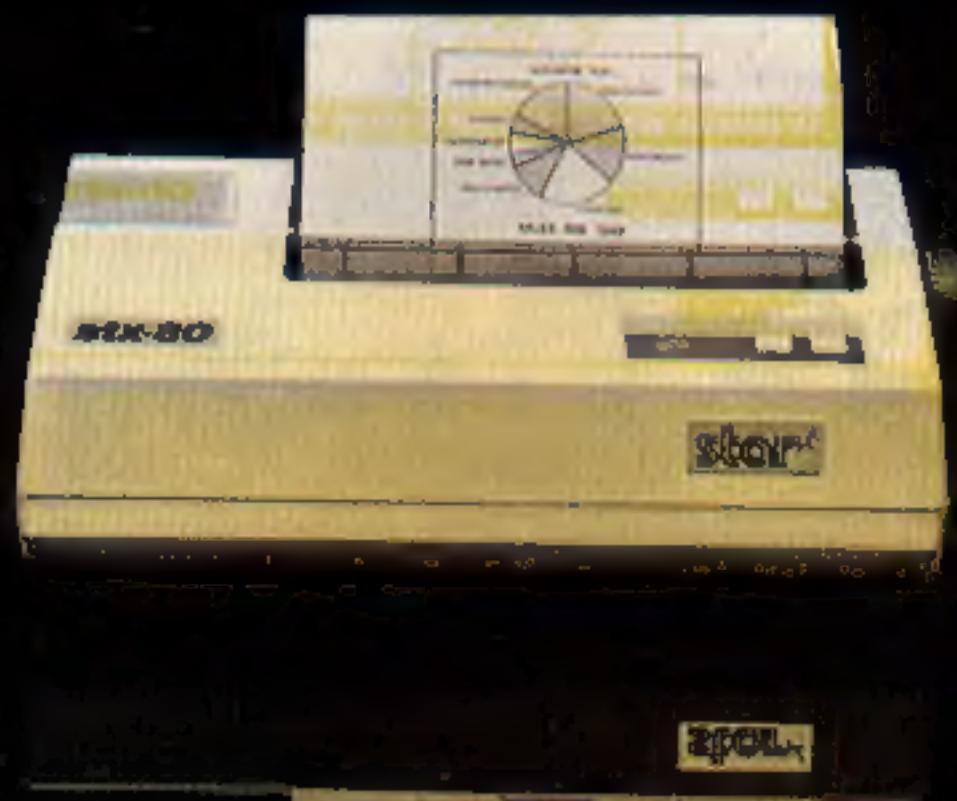
The STX-80 thermal printer from Star Micronics. It combines high performance with a very low price. So now, there is nothing in the way of owning a quality printer.

*Manufacturer's suggested retail price.



star
MICRONICS, INC.

THE POWER BEHIND THE PRINTED WORD.
Computer Peripherals Division, 1120 Empire Central Place,
Suite 210, Dallas, TX 75247 (214) 821-8960



The new STX-80 printer for only \$199.*



TI LOGO: It opened a door they thought was locked.

It opened a door to their minds.

The key: a Texas Instruments Learning Computer and TI LOGO, a programming language developed by TI and MIT.

In his inner-city, New York junior high classroom, teacher Steve Siegelbaum explains why it works so well.

"When they use it, they think they're teaching the machine. In reality, it's teaching them how to

learn. It definitely improves their attitude toward their other courses. Written and verbal expression improve—they're eager to show you, to tell you, what they've done."

Another teacher, Pete Rentof, adds, "What it fights is fear of failure—a mistake becomes a starting point. The whole learning process turns into a positive experience. It works."

The TI Learning Computer,

with TI LOGO and many other educational programs, is equipped to help open doors in any classroom. Including yours. For information on this remarkable system, contact: Texas Instruments Customer Relations, P.O. Box 53 Lubbock, Texas 79408.



**TEXAS
INSTRUMENTS**

© 1982 Texas Instruments